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**Alpini equipped with skis fighting on a glacier in the mountains of the Trentino.**

# TOPOGRAPHY AND STRATEGY IN THE WAR

BY

DOUGLAS WILSON JOHNSON

Associate Professor of Physiography in Columbia University

WITH MAPS AND ILLUSTRATIONS

NEW YORK

HENRY HOLT AND COMPANY

1917

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Published November, 1917

THE QUINN & BODEN CO. PRESS
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# PREFACE

As a student of land forms who is more or less familiar with the broader topographic features of Europe the writer has had a professional as well as a personal interest in the great war. He was particularly anxious to discover how far modern military operations are still affected by the element of terrain; and whether guns which hurl high explosive shells with marvelous accuracy over lofty mountain ridges and across the widest river valleys, aeroplane service which permits better observations than can be secured from the most favorably situated topographic eminences, and modern engineering devices which refuse to be daunted by the deepest stream or steepest cliff, have eliminated the surface features of the land as an important factor in military calculations. Aided by large scale maps showing with precision the topography of the principal battle fronts he has, from the first days of the war, followed with some care the changes on each front, and has found ample indication that the rôle played by land forms in plans of campaign and movements of armies is no less important today than in the past. To emphasize this interesting relationship between inanimate Nature and the science of war is one of the objects of this book.

Another object, and perhaps the more important, is to place before the reader such a picture of each theater of war as shall enable him to follow with greater ease and livelier interest the movements of our own and our Allies' troops. If the surface features of Europe control in important measure the issues of the various campaigns, contributing to success in one field and imposing failure in

another, then obviously a knowledge of the topographic elements peculiar to each front is essential to an intelligent understanding of the war despatches printed daily in the press. Maps ordinarily accessible to the public are inaccurate and vague, and there exists no single volume giving such maps, diagrams, photographs, and word descriptions of the theaters of war as will provide the reader with good mental pictures of those fields on which the battles of democracy are being waged. To meet this need, so far as I am able, is the chief purpose of this volume. In order to give it a maximum of usefulness I have endeavored to combine scientific accuracy in the descriptions of topography with a treatment which avoids the use of technical terms.

Each important theater of war is discussed in a special chapter, which deals with the more striking surface features affecting military operations. Then follow one or more chapters reviewing the history of the campaigns in that particular area during the first three years of war, and pointing out the manner in which the element of terrain has affected army movements. It will be seen that this method of treatment incidentally provides a summary history of the chief military operations on the several fronts up to the time when America took her place among the combatants, and it is hoped this feature of the volume will prove of service to the reader. No effort has been made to prepare a complete history of the war, however, and the writer makes no claim for special accuracy of detail or novelty of material in so far as this phase of the work is concerned. His task has been to picture the theaters of war and to emphasize the influence of land forms upon military operations; and in recording the succession of military events he has relied upon the approximate dates and position marks indicated on his own war maps, supplemented by such military reviews and reports of operations as are available to

any reader. He is quite sensible of the fact that when the full history of the war is written many errors of detail in these pages may have to be corrected; for while the maps themselves are accurate, official reports of troop positions issued during the war are always very generalized, usually extremely meager, and often purposely misleading. It is believed, however, that no corrections which may be required will in any wise alter the validity of the general conclusions set forth in the pages which follow.

To the American Geographical Society I must express my obligation for their generous permission to make full use of a number of essays on the war which I contributed to their publications, the *Bulletin* of the Society and its successor, *The Geographical Review*. The essays which appeared in the *Bulletin* and which were in part reprinted in the *Journal of the Military Service Institution*, have been entirely rewritten; others appearing more recently in the *Review* have been brought up to date but otherwise not greatly modified; while a number of the chapters appear here for the first time. All of the maps were specially prepared under my direction by the draughtsmen of the American Geographical Society. The diagrammatic view of the eastern theater of war was drawn for me by one of my former students, Dr. A. K. Lobeck. It is appropriate also that I should acknowledge my debt to the published articles and books of Hilaire Belloc, whose reviews of military operations during the war have been of service in clarifying details of troop movements.

DOUGLAS WILSON JOHNSON.

*Columbia University,*
*September* 1, 1917.

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# TOPOGRAPHY AND STRATEGY IN THE WAR

## CHAPTER I

## THE WESTERN THEATER OF WAR

THE violation of Belgian neutrality was predetermined by events which took place in western Europe several million years ago. Long ages before man appeared on the world stage Nature was fashioning the scenery which was not merely to serve as a setting for the European drama, but was, in fact, to guide the current of the play into blackest tragedy. Had the land of Belgium been raised a few hundred feet higher above the sea, or had the rock layers of northeastern France not been given their uniform downward slope toward the west, Germany would not have been tempted to commit one of the most revolting crimes of history and Belgium would not have been crucified by her barbarous enemy.

Influence of terrain

For it was, in the last analysis, the geological features of western Europe which determined the general plan of campaign against France and the detailed movements of the invading armies. Military operations are controlled by a variety of factors, some of them economic, some strategic, others political in character. But many of these in turn have their ultimate basis in the physical features of the region involved, while the direct control of topography upon troop movements is profoundly important. Geological history had favored Belgium and northern France with valuable

deposits of coal and iron which the ambitious Teuton coveted. At the same time it had so fashioned the topography of these two areas as to insure the invasion of France through Belgium by a power which placed "military necessity" above every consideration of morality and humanity. The surface configuration of western Europe is the key to events in this theater of war; and he who would understand the epoch-making happenings of the last few years cannot ignore the geography of the region in which those events transpired.

### *The Natural Defenses of Paris*

**The Paris Basin**

What is now the country of northern France was in time long past a part of the sea. When the sea bottom deposits were upraised to form land, the horizontal layers were unequally elevated. Around the margins the uplift was greatest, thus giving to the region the form of a gigantic saucer or basin. Because Paris today occupies the center of this basin-like structure, it is known to geologists and geographers as "the Paris Basin."

Since the basin was formed it has suffered extensive erosion from rain and rivers. In the central area where the rocks are flat, winding river trenches, like those of the Aisne, Marne, and Seine, are cut from three to five hundred feet below the flat upland surface. To the east and northeast the gently upturned margin of the basin exposes alternate layers of hard and soft rocks. As one would naturally expect, soft layers like shales have readily been eroded to form broad flat-floored lowlands, like the Woevre district east of Verdun. The harder limestone and chalk beds are not worn so low, and form parallel belts of plateaus, the "côtes" of the French. These plateau belts and the intervening parallel lowlands are best shown in bird's-eye view by a diagrammatic sketch of western Europe (Fig. 1).

**Plateaus and lowlands**

The diagram represents a block of the earth's crust, cut out so as to show in cross section the manner in which the hard rock layers have been eroded to form the plateau cliffs.

East-facing scarps

The fact that the rock layers dip toward the center of the basin has one striking result of profound military importance. Every plateau belt is bordered on one side by a steep, irregular escarpment, representing the eroded edge of a hard rock layer; while the other side is a gentle slope having about the same inclination as the dip of the beds. As will be seen from the diagram, the steep face is uniformly toward Germany, the gentle back-slope toward Paris; and the crest of the steep scarp always overlooks one of the broad, flat lowlands to the eastward. The military consequences arising from this peculiar topography will readily appear. It is not difficult to understand why the plateau belts have long been called "the natural defenses of Paris."

Imagine yourself at Paris, and start on a tour of inspection eastward to the German border. First you traverse the central plateau of the Paris Basin, called by many the Isle of France because of an ancient theory that the circular line of bordering cliffs was cut by the waves of the sea. Here and there, especially if you turn northward or southward in your journey, you come suddenly upon the edge of a river valley trenching the plateau across which you are traveling. Descending the steep slopes of the valley wall, which are often clothed in forests, you reach the flat valley floor several hundred feet below, and make your way over the winding stream. Perhaps the season is wet, and you wade through marshes on both sides of the river until the dry land of the opposite valley wall is reached. Toiling painfully up the slope you at length come out again upon the flat upland of the plateau surface. Pausing to rest, you look back at the obstacle you have just traversed, and reflect

Valley trenches

that a number of such obstacles cross the plateau in parallel courses from east to west. You realize that they must prove serious barriers to the advance of armies moving southward or northward; and as you remember that two of these obstacles bear the names of the Marne and the Aisne, you have a fuller understanding of two notable chapters in recent military history.

**Quarries and caverns**

As you journey onward you pass numerous quarries, some of them broad and deep. Cavern mouths tempt you to explore vast subterranean excavations where limestone or chalk in large quantities has been removed, leaving vast galleries and chambers which could easily house many thousands of troops safe below reach of the heaviest shell explosions. An army intrenched behind the natural moat of one of the east-west river trenches, as for example the Aisne, and utilizing surface quarries and underground caverns for the protection of its men, might well consider itself impregnable against every assault of the enemy.

**The first escarpment**

Musing thus, you continue eastward, until suddenly you arrive at the brink of the first line of east-facing escarpment. Behind you stretches the plateau whose surface features you have just been studying. In front of you, to the east, spread out below like a gigantic map, is the level surface of the Champagne lowland. As you look down upon it you see roads, like narrow white ribbons, bordered on both sides by green vineyards, while the steep slopes of the escarpment itself are often cleared of their trees and cultivated. At your feet, where the west-flowing Marne cuts its gateway through the escarpment, lies the town of Epernay, while to the north the towers of Rheims Cathedral mark the similar gateway of a branch of the Aisne. Southward the marsh of St. Gond occupies a former river valley on the flat floor of the plain, its boggy surface a trap which captured many pieces of German artillery. Far out over chalky flats to the

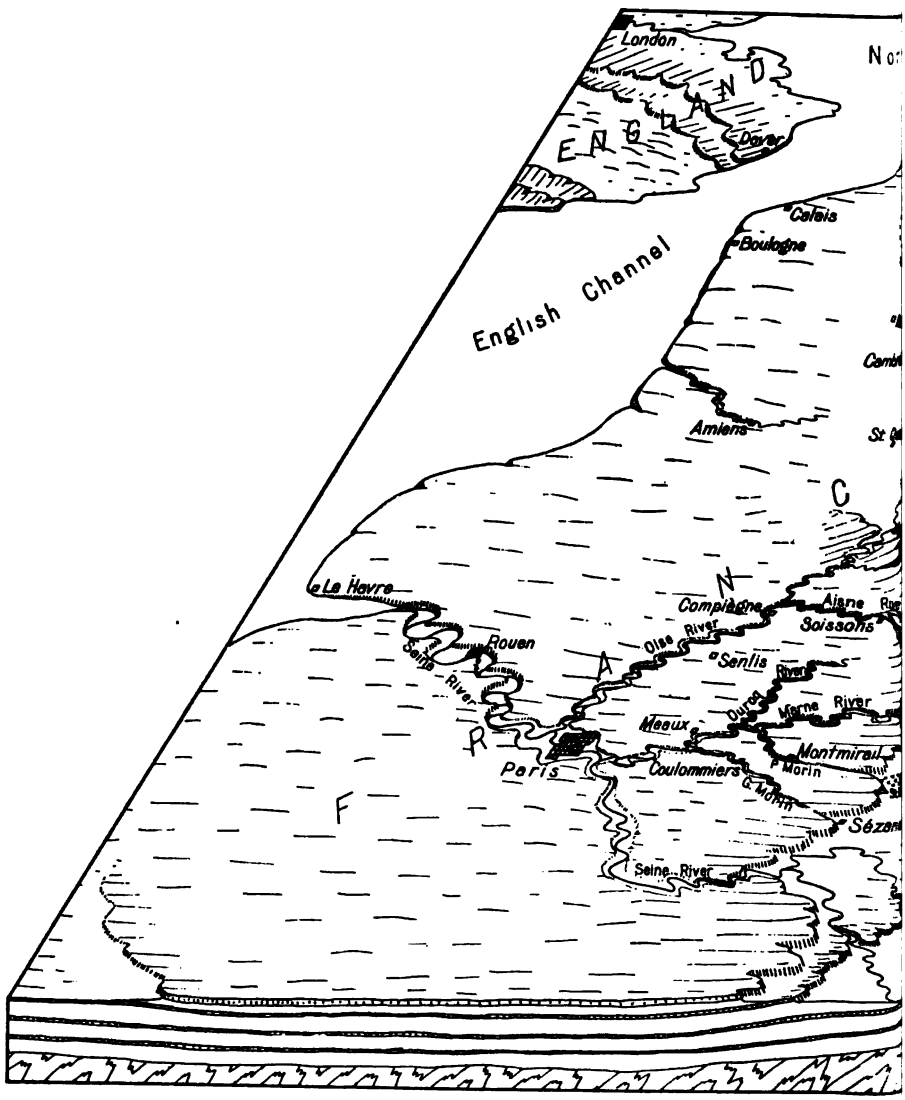
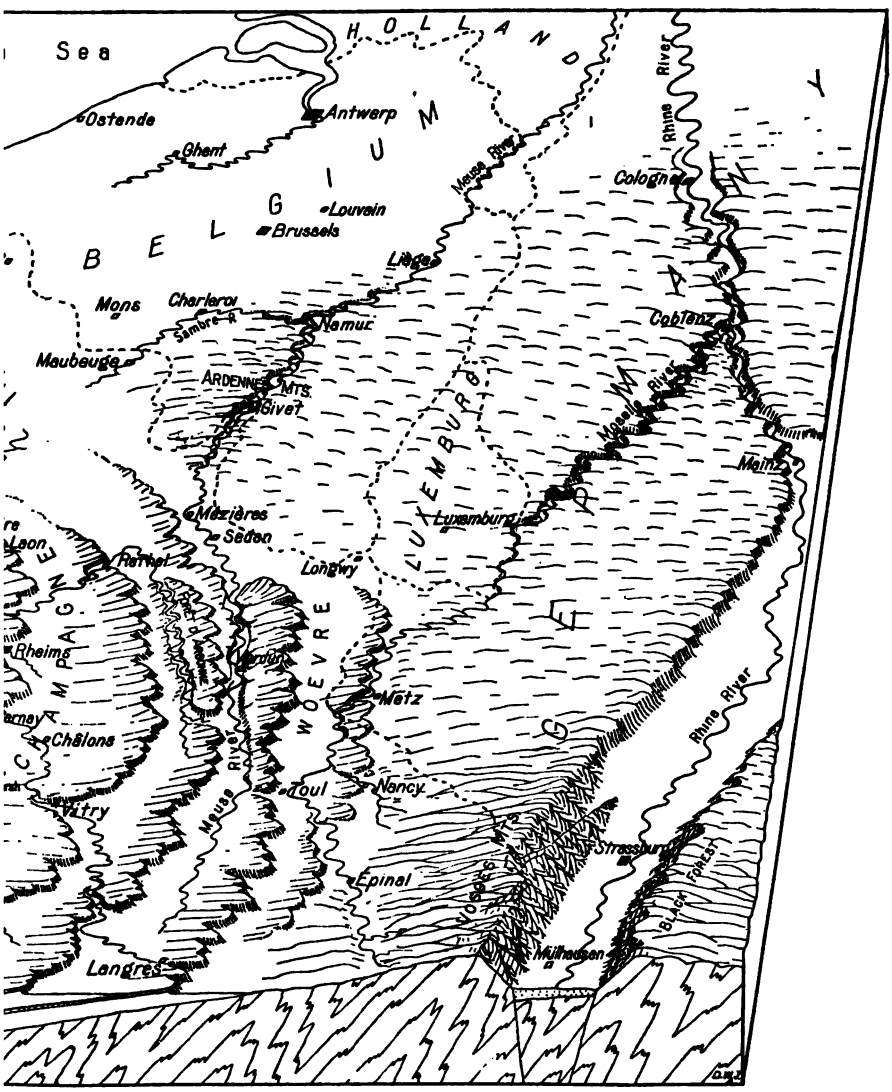



**Figure 1. Diagrammatic view of the western theater of war, showing the prind which have influenced military operations. The undergro**




plateaus and plains, mountains and lowlands, cliff scarps and river trenches rock structure is shown in the front edge of the block.

east lies the famous armed camp at Châlons. Nothing is hidden from view in that broad panorama of plain.

View from the crest

What a position is yours from which to check a westward advance upon Paris! Every enemy movement would be open to observation from the crest of the scarp, and could be broken up by fire from artillery concealed in ravines back from the plateau face. Assaults on intrenched positions on the slopes and crest of the scarp would be made with every advantage on the side of the defending troops. The level plain below offers little opportunity for the offensive to secure concealed artillery positions from which to make preparation for the uphill infantry charges. It was reported in early despatches of the war that during the Battle of the Marne the German center, stretching eastward from Sézanne at the base of the cliffs farther south, was subjected to a disastrous artillery fire from the crest of the scarp which broke up concentrations of reserves on the plain and prevented the reinforcement of the German line at critical moments.

The plain of Champagne

Profoundly impressed with the strength of this natural defense line before Paris, you descend to the plain of Champagne and move eastward over its surface. For thirty-five or forty miles your course is over a dry chalky soil, a region comparatively unfruitful where only scattered growths of trees relieve the semi-desert aspect. This is known as the "Dry Champagne," as the rain which falls on the porous chalk soon sinks to depths which the plants cannot reach. Farther east is the "Wet Champagne," where a narrower belt of impervious clay keeps more of the water on the surface, there to form numerous brooks and marshes, and to support a goodly forest growth.

The second escarpment

Crossing the Wet Champagne, you begin a gradual eastward ascent which does not end until you stand, for a second time, at the crest of an east-facing scarp. The lowland

now spread out below you to the east is traversed by the winding course of the upper Aisne, slightly entrenched in the floor of the plain; and the main river gateways cutting through the escarpment are marked by the towns of Rethel and Vitry. Again you are impressed with the topographic advantages favoring the defenders of Paris from an attack from the east. The conditions are essentially those already noted from the crest of the first escarpment, save for the absence of the arid, chalky soil of the Dry Champagne.

**The third escarpment**

You push across the valley of the upper Aisne, on up the gentle back slope of the next plateau belt, until for a third time you stand at the crest of a steep east-facing escarpment, and look down upon a lowland spread out like a map at your feet. All about you the plateau is heavily forested, and cut here and there by the deep, wild gorges of numerous streams, which flow westward to the lowland just left behind, or eastward to the lowland at the base of the scarp. This wooded plateau belt is the Forêt d'Argonne, where more than one battle of France has been fought.

**Forêt d'Argonne**

**Verdun escarpment**

Descending the face of the Argonne scarp and crossing the valley of the Aire River, you continue eastward across a minor plateau strip and reach the winding trench of the Meuse. Past immortal Verdun and its outlying forts, you press on to the crest of the next great scarp. What a view here meets the eye! To the north and south stretches the long belt of plateau, cut into parallel ridges by east- and west-flowing streams,—ridges like the Côte du Poivre, whose history is written in the blood of brave men. Below, to the east, lies the flat plain of the Woevre, whose impervious clay soil holds the water on the surface to form marshes and bogs without number. Here the hosts of Prussian militarism fairly tested the strength of the natural defenses of Paris, and suffered disastrous defeat. Moving westward under the hurricane of steel hurled upon them

**Plain of the Woevre**

from above, their manœuvering in the marshes of the plain easily visible to the observant enemy on the crest, the invading armies assaulted the escarpment again and again in fruitless endeavors to capture the plateau. Only at the south where the plateau belt is narrower and the scarp broken down by erosion did the Germans secure a precarious foothold, thereby forming the St. Mihiel salient; while at the north entering by the oblique gateway cut by the Meuse River, they pushed south on either side of the valley only to meet an equally disastrous check at the hands of the French intrenched on the east-and-west cross ridges. Viewing the battlefields from your vantage point on the plateau crest, you read a new meaning in the Battle of Verdun. You comprehend the full significance of the well-known fact that it was not the artificial fortifications which saved the city. It was the defenses erected by Nature against an enemy from the east, skilfully utilized by the heroic armies of France in making good their battle cry, "They shall not pass." The fortified cities of Verdun and Toul merely defend the two main gateways through this most important escarpment, the river gateway at Verdun being carved by the oblique course of the Meuse, while the famous "Gap of Toul" was cut by a former tributary of the upper Meuse, long ago deflected to join the Moselle. Other fortifications along the crest of the scarp add their measure of strength to the natural barrier.

Toul Gap

Once more you resume your eastward progress, traverse the marshy and blood-soaked plain of the Woevre, ascend the gentle back slope of still another plateau belt, and stand at last on the crest of the easternmost escarpment. Topographically this is the outermost line of the natural defenses of Paris, and as such might be claimed on geological grounds as the property of France. But since the war of 1870 the northern part of this barrier has been in the hands of

The Metz escarpment

Germany, who purposed in 1914 to widen the breach already made in her neighbor's lines of defense. Metz guards a river gateway cut obliquely through the scarp, and has, therefore, a strategic value of the very highest importance.

**Nancy gateway**

Farther south is Nancy, marking the entrance to a double gateway through the same scarp. Here in the first week of September, 1914, under the eyes of the Kaiser, the German armies, moving southward from Metz, where they were already in possession of the natural barrier, attempted to capture the Nancy gateways and the plateau crest to the north and south. Once again the natural strength of the position was better than the Kaiser's best. From the Grand Couronné, as the wooded crest of the escarpment is called, the missiles of death rained down upon the exposed positions of the assaulting legions. The Nancy gateway was saved, and more than three years from that date is still secure in the hands of the French. The test of bitter experience has fully demonstrated to the invading Germans that it was no idle fancy which named the east-facing scarps of norther France " the natural defenses of Paris."

**The Grand Couronné**

**River gateways**

It is but reasonable to expect that many of the rivers of northern France should flow down the dip of the rock layers and converge toward the center of the Paris Basin, where the beautiful city itself is located. A glance at a map, or at the diagram opposite page 4, will show that this expectation is fully realized. Most of the river gateways through the concentric lines of escarpments have been carved by these converging streams, or by streams which did so converge before they were deflected to other courses by drainage rearrangements resulting from the excavation of the parallel belts of broad lowlands. Of course these natural openings through the plateau barriers have great strategic value, and must figure prominently in any military operations in the Paris Basin. They constitute the only feasible routes along

which armies and their impedimenta may cross the barriers, as elsewhere steep grades and poor roads are the rule. At each of them a town of greater or less importance has sprung up, and both town and gateway are protected either by permanent forts or hastily constructed field fortifications. So great is the strategic value of the principal gateways, such as those near Toul and Verdun, that we find them marked by some of the most strongly fortified cities in the world. The fortifications dominate the roads, canals, and railway lines which pass through the openings, and must be reduced before the cities can be occupied and the transportation lines freely used. This explains the significance of the frequent mention, especially in the war despatches of the first year, of such towns as La Fère, Laon, Rheims, Epernay, and Sézanne guarding gateways in the first line of cliffs east of Paris; of Rethel and Vitry in the second line; of Bar-le-Duc in the third; of Verdun and Toul in the fourth; of Metz and Nancy in the fifth; to say nothing of other points in the same and lesser scarps not considered in this volume.

**Strategic value of gateways**

The importance of the strategic gateways will readily appear if we consider their relation to principal railway routes. No railway of eastern France can traverse the country from the German frontier to Paris without seeking out and passing through several of these fortified gateways in succession. Take, for example, the main through line from Strassburg to Paris. After crossing the German border it follows the valley of the Meurthe a short distance to reach one of the two Nancy gateways. Turning west through this opening in the Metz-Nancy escarpment, it makes straight for the famous Gap of Toul in the Verdun-Toul escarpment. Once through the Gap, the line bends north to find an opening in the Forêt d'Argonne scarp near the town of Bar-le-Duc. Westward from here the route runs some thirty or forty miles to Vitry, where there is a gateway through

**Relation of gateways to railroads**

the Rethel-Vitry escarpment. At Vitry the line divides, one branch turning northwest to cut through the innermost line of cliffs at the Epernay gateway, the other continuing west to make use of the gateway at Sézanne. Evidently there are along this one line at least five strategically important defiles through a corresponding number of military obstacles, all of which defiles must be controlled by the armies which would make free use of the Strassburg-Paris route.

**The Sedan lowland**

Toward the northwest the several lines of plateau escarpments gradually descend, and ultimately merge with the undulating plain of northern France. The low land between these fading escarpments on the one hand and the rough country of the Ardennes Mountains on the other, gives a roundabout but easy pathway along which one might reach Paris by swinging west beyond the ends of the scarps. Longwy, Montmédy, Sedan, and Mézières are the important points along this route, which is followed by a railway of much strategic value and which was quickly seized by the Germans after they had reduced the antiquated fortifications affording it a poor protection. As a route for an advance on Paris it is too circuitous to be of prime importance.

### *The Vosges Mountains and Rhine Valley*

Beyond the limits of the natural fortifications of Paris are three outlying regions, each possessing a peculiar topography which has indelibly stamped its impress on the western campaigns. These regions are: to the east, the Vosges Mountains and the Valley of the Rhine; to the northeast, the mountains of western Germany and southern Belgium; to the north, the plain of northern France and Belgium. Let us examine these regions in the order named.

It will be seen from the diagram, opposite page 4, that the

The broad, flat floor of the middle Rhine valley, as seen from the foothills of the Black Forest Mountains.

folded rocks underlying the horizontal layers of the Paris Basin come to the surface at the east, forming rugged mountains from which the later beds have been completely eroded. Originally this eastern rim of the Basin was a broad north-south arch, with a gently rounded summit; but a north-south block of rock extending along the crest, and bounded by two parallel fractures or rifts in the earth's crust, dropped down several thousand feet, giving the broad, flat-floored valley of the middle Rhine, or the Rhine Graben as it is known to the Germans. The river has spread a thick mantle of sand and silt over the surface of the down-dropped block, and now swings in a gracefully curving channel in its own deposits. The fertile plains of this valley floor constitute that part of the province of Alsace which the French are most anxious to recover from the Germans.

**The Rhine "Graben"**

The two remaining limbs of the former arch, facing inward toward the down-dropped central strip, are known as the Vosges Mountains on the west and the Black Forest on the east. Each of these ranges has a gentle slope away from the valley, and a steep face toward the valley representing the once nearly vertical fracture surface now eroded into sharp crested ridges and narrow ravines. Both slopes of each range are sufficiently rugged to make agriculture difficult and the building of roads and railroads expensive; hence the ranges are but little developed, and much forested land remains. But it is on the steeper slopes which lead abruptly downward to the flat floor of the Rhine Valley that the ridges are most rugged and the forest most unbroken. Here the movement of large bodies of troops is particularly difficult, especially if they must ascend the slopes in the face of a determined enemy.

**The Vosges barrier**

It was not political expediency alone which led the French to invade southern Alsace at the beginning of the war. The international boundary line follows the crest of the southern

**The invasion of Alsace**

Vosges, and it was much easier for the French to move up the gentle west slope of the Vosges, capture the passes, and then sweep down the steep eastern face upon the flat plains about Mülhausen, than it was for them to cross the boundary farther northwest, where no such advantage was furnished by the topography. A French soldier, writing home from the battle line in the Vosges, described the influence of topography upon the fighting in that district in the following words: "Our task has been much easier in the southern Vosges than farther north. In the south it is all downhill after we cross the border; but in the north we must fight uphill against the Germans after we have entered their territory, as there the boundary line lies west of the mountain crest."

**Contrasted slopes of the Vosges**

It has been stated in press reports that a commander of German forces at Mülhausen, ordered to lead his men across the Vosges Mountains into France, made three futile attempts to carry the heights of the range in the face of French artillery. Then came an urgent message from the Kaiser: "The crest of the Vosges must be carried at any cost." A fourth desperate assault by the intrepid commander ended in his defeat. Retiring to his quarters the unhappy general, according to the story, committed suicide, first sending to his Kaiser this message: "The Vosges cannot be crossed. Come and try it yourself." I would not care to vouch for the truth of the story; but it serves to illustrate the peculiar surface features of the Vosges which render their ascent comparatively easy from the French side of the border but very difficult from the German side. This is the key to the significant fact that after three years of desperate offensives the only place where the German troops have been unable to expel the French from German soil is on the steep eastern face of the Vosges Mountains.

In this connection it is interesting to note that should

Schlucht Pass on crest of Vosges Mountains, showing contrast between steep eastern face (foreground) and more gentle western slope (background). In lower left-hand corner is the carriage road ascending to the pass.

Güntherstal, showing typical topography of the lower courses of valleys heading against the steep scarps of the Vosges and Black Forest Mountains.

the French succeed in pushing the Germans back to the east side of the Rhine, their further eastward advance in southern Germany would then be opposed by precisely the same topographic difficulties which have long retarded the westward movement of the Germans in southern Alsace. The Black Forest will replace the Vosges in immediate importance, and while the Germans hold the crest and more gentle eastward slope of this range the French will find assaults against the steep west-facing scarp both costly and difficult.

**Terrain of the Black Forest**

Not far south of Mülhausen, but beyond the limits of the drawing, on page 4, the Vosges Mountains descend to a low pass which connects the Rhine valley with the valley of the Saône in eastern France. In this pass, guarding the strategic gateway from one valley to the other, stands the mighty fortress of Belfort, the southernmost of the great fortifications erected against a German invasion. Entrance to France by this route is easy, so far as the natural physical features alone are concerned; and in the commercial intercourse between the two nations the gateway has played an important rôle. But the opening is narrow enough to be effectively defended by the fortress in its center and to permit the concentration of troops in such numbers as to render its passage by an invader extremely difficult. Whether the fortress which withstood the attacks of the Germans in 1870 can defy the guns which reduced Liège, Namur, Maubeuge, and Antwerp will be determined only in case the Germans can push the French field army back far enough to bring their heavy siege artillery within range of the walls of Belfort.

**The Belfort gateway**

### *The Mountains of Western Germany and Southern Belgium*

North and west of the Vosges Mountains the older series of folded rocks, exposed at the surface around the margin of the Paris Basin, have not been raised so high as in the

**The mountainous upland**

Vosges. Instead they form an upland of moderate elevation, which was once a nearly level erosion plane; but which, since the uplift, has been cut into hills and valleys by many branching streams. This hilly country is known as the Slate Mountains, the Haardt, the Eifel, and by other names in Germany, and as the Ardennes in southern Belgium. Although usually described as mountainous, the most striking feature of the area is the remarkably even sky-line which appears in every distant landscape view, and which is proof that the much folded rocks were once worn down to a surface of faint relief, after which warping raised the surface to its present position and permitted its dissection by river erosion. The upland is now so badly cut up by streams that cross-country travel is difficult, and transportation lines tend to follow the valleys.

**Valley defiles**

Two main rivers cut deep trenches across this upland from southwest to northeast—the Moselle and the Meuse; while the lower Rhine transects it from southeast to northwest. Despite its excessively meandering course the Moselle gorge has been, from time immemorial, one of the chief pathways through the broad mountain barrier, and the strongly fortified city at its junction with the Rhine bears a name, Coblenz, which reminds us of the fact that in Roman times this was recognized as an important "confluence." In the present war the Moselle has served as the chief line of communication for one of the German armies of invasion, but if the Allies succeed in driving the invaders out of Belgium and back toward the Rhine, the great natural moat of the Moselle trench would change its rôle, and become a military barrier of the first importance behind which the Germans might hope to check the Allied advance.

**Gorge of the Moselle**

**Gorge of the Meuse**

The gorge of the Meuse is the second great natural highway through the upland barrier, and cleaves its way through the heart of the Ardennes Mountains. Less winding than

Meandering gorge of the Moselle River, showing great bend near Marienburg and the even skyline of the upland through which the river cuts its trench.

the Moselle, it is scarcely less important, especially if we include the branch gorge of the Sambre, which joins the main trench at Namur. For the Sambre leads one southwestward to a low divide whence the headwaters of the Oise may be entered and followed directly to Paris. The combined Meuse-Sambre-Oise valley route is followed by a through railway line from Berlin to Paris, and for this reason was heavily guarded by the fortifications of Liège, Huy, Namur, and Maubeuge. Commanding the main gorge of the Meuse southward from Namur were the forts at Dinant and Givet.

**Defensive value of the Meuse-Sambre trench**

Both the Meuse and the Sambre trenches, now serving as principal lines of communication and supply for the German armies, were utilized by the Allied armies in August, 1914, as protective barriers behind which they waited to receive the first great shock of the German onslaught. The main Allied front faced north, and between Namur and Charleroi was protected by the lesser gorge of the Sambre; while the right flank enjoyed the admirable protection of the deep, steep-sided canyon of the Meuse. Those familiar with the steep rocky walls of this larger trench will readily appreciate what a high defensive value it must have possessed. The causes of its ultimate abandonment by the Allied forces are touched upon in another chapter.

**Gorge of the Rhine**

The famous gorge of the Rhine, with its precipitous walls from which ruined castles look down upon the swift current of the great river, is better known to the world than the valleys of the Moselle and Meuse. From the earliest times it has been one of the chief routes of transportation and communication in western Europe, and today five important transport lines thread the narrow defile,—two railways, one on either side of the river; two auto roads, one on either side; and the steamboat route on the river itself. In few places in the world can one find such a striking contrast as

when, standing on the upper rim of the gorge, he looks out over the quiet farms and sleepy villages on the upland surface, then down upon the busy thoroughfare where trains, autos, wagons, and steamboats form a constant stream of hurrying traffic.

**Defensive and offensive value of the Rhine gorge**

The two ends of the Rhine trench are guarded by Mainz and Cologne, two of the strongest fortified cities in Germany; while near the middle stands the strong fortress of Coblenz. Here then is a natural moat of impressive dimensions, carrying a swift, deep river, and heavily fortified at its most accessible points. German armies retreating from Belgium in the north could hope to check, along this trench, the most vigorous assaults of a pursuing enemy. Thus far, however, we are concerned with the Rhine trench as a line of communication connecting central Germany with military bases in the west from which attacks on France could most conveniently be launched. It is evident that two armies with headquarters at Coblenz and Cologne, and supplied by the railways, auto roads, and steamer routes which pass through the Rhine gorge, could attack France simultaneously if one ascended the Moselle to Luxemburg and the other passed from Cologne westward around the north side of the hilly country to the Meuse, and then followed southward up that valley. Hence it was that in the early weeks of the war we heard much of the "army of the Moselle" and the "army of the Meuse"; and the capture of Liège, Huy, Namur, Dinant, and Givet marked the progress of the latter army along the best pathway through the Ardennes.

### *The Plain of Northern France and Belgium*

**Terrain of the undulating plain**

Northward from Paris, and west of the fading belts of plateaus and scarps which characterize the eastern and northeastern sectors of the Paris Basin, stretches the un-

Gorge of the Rhine River through the Slate Mountains of western Germany, showing level skyline of the flat-topped uplands. At the right are ruins of one of the ancient castles which once guarded this highly important trade route, while below is the modern village of St. Goar.

dulating plain of Normandy, Picardie, and Artois. The underlying rock layers are practically horizontal and are exposed in picturesque manner along the coast where the waves of the sea have cliffed the margins of the land. Branching streams of moderate size have dissected the surface of the plain into a complex system of low hills with gently rounded slopes, those sufficiently large to be called rivers having eroded shallow valleys whose flat floors are not infrequently, as in the case of the Somme, covered with ponds and marshes. Above the valley bottoms the uplands are dry, and crossed by a network of excellent roads and railways. Even where valleys interrupt the surface the slopes are gentle, and in all this region there is not a single military barrier of the first magnitude. Marshy valleys of small streams, hill slopes, and occasional low ridges would figure in intensive fighting where opposing armies were deadlocked; but striking topographic barriers do not exist.

In Belgium the plain continues, but takes on a double aspect. From the margin of the hilly Ardennes northwestward toward the sea the surface is much like that described above, except that it is in general more gently undulating, even monotonously level over broad areas. Roads and railways make a dense network affording excellent communications in every direction. Nearer the coast, however, the land slopes down beneath the level of high tide, and becomes an absolutely flat, treeless plain. Belts of sand dunes along the shore and artificial dikes alone prevent the waters of the sea from flooding the land when the tide is high. Rivers crossing this belt must themselves be diked to prevent the indefinite spreading of their waters. Thus it happens that they are practically converted into canals, and like the lower Yser are called indifferently "canals" or "rivers." A close-set network of smaller canals helps to drain the flat, marshy surface, but forms an endless system of obstacles to

Flat plain of Flanders

free movement through the region. The level of permanent groundwater is at or near the surface, and trenches dug in the marshy soil can scarcely be effectively drained. Trench-life here is at its worst, and omnipresent mud adds its miseries to field life on the Flanders plain.

**Fertility of the plain**

The higher parts of the plain, both in France and in Belgium, are covered with deposits of fine-grained loess and loam which afford a fertile soil easily cultivated. As a result the population is dense, and agriculture flourishes. Forests have been largely removed to permit the intensive farming of every available acre. It will be evident, therefore, that both the richness of the country and its favorable topography combine to make this plain a natural pathway from eastern and central Europe into France. It has, indeed, been called the gateway to northern France, and forms part of the greater plain belt over which one may travel by rail from northeastern Russia to the Pyrenees without passing through a single tunnel and without rising 600 feet above the level of the sea. From the military standpoint it presents four prime advantages: it is interrupted by no topographic barrier of serious importance; it is supplied with numerous parallel roads and railways by means of which to advance simultaneously different columns of troops; it is productive enough to supply food for the sustenance of large armies for long periods of time; and it passes close to important coal and iron deposits in the borders of the Ardennes, and has, indeed, important coal fields lying immediately below its level surface.

**Strategic value of the plain**

In concluding our examination of the plain, let us note one peculiar feature of its position in eastern Belgium. Here the rugged country of the Ardennes reaches north to the vicinity of Liège, while Holland sends far southward a great peninsula of her territory in the form of the province of Limburg. The Belgium portion of the plain is thus nar-

**The Liège gateway**

Typical road on the gently undulating plain of northern France. This is the type of surface which made possible the rapid German advance on Paris.

Sea cliffs cut in the margin of the plain of northern France, showing horizontal rock layers underlying the plains surface.

rowed to a neck of land only a few miles in width. German troops desiring to enter the Belgian plain would thus find themselves confined between the hill country on the south and Dutch territory on the north. Across the narrow gateway cuts the valley of the Meuse River, and blocking passage of both river and gateway stood the forts of Liège. Manifestly free access to the broader plain beyond would not be possible until the forts had been reduced and their guns silenced.

Summary

We have completed our survey of the surface features of the western theater of war, and have found that the Vosges Mountains, the mountains of western Germany and the Ardennes in Belgium constitute a broad outer zone of comparatively difficult country, within which concentric belts of plateaus with east-facing scarps defend the most direct approaches to Paris. Only through Belgium into northern France is there a level pathway, free from obstacles, of great breadth most of the way, and provided with every facility for the rapid movement and prolonged sustenance of large armies. In the following chapters we will see how profoundly these physical features affected the general plan of the German campaign and the detailed movements of the opposing armies.

## CHAPTER II

## THE PLAN OF CAMPAIGN

First route of invasion

If the reader will turn back to the diagram opposite page 4 he will see at a glance that four principal routes of invasion were open to Germany in her campaign against France. She could, for example, concentrate her main armies in the valley of the Rhine with bases at Strassburg and Mülhausen, and in the country about Metz to enter by the so-called Lorraine gateway. An advance westward from Strassburg or Mülhausen would encounter the high and steep east-facing scarp of the Vosges Mountains, a topographic feature which as we have already seen imposes practically impossible conditions upon a German offensive. On the other hand the main advance from this region might be made by turning either end of the mountain barrier, passing through the Belfort gateway between the Jura Mountains and the southern end of the Vosges; or between the north end of the range and Luxemburg, through the gateway of Lorraine. In the first instance the ring fortifications of Belfort block the way, and since they effectively command every transportation line through the pass their complete reduction would be necessary before an advance would be possible. From the southern foothills of the Vosges to the neutral territory of Switzerland in the Jura foothills the distance is but ten or fifteen miles, and the narrowness of the gap would favor the defense and prevent satisfactory manœuvering of the attacking forces. Firmly intrenched in the gateway, their left flank secure against the difficult Vosges and their right flank protected by the neutral Swiss hills, supported by one

of the four strongest fortified camps of France and supplied by adequate rail connections with the rear, the French armies could render an advance into their country by this route at best a slow and costly undertaking.

Necessity of a route favoring a swift advance

In order to understand the German plan of campaign we must remember that rapidity of action was of its very essence. German strategists have long maintained, and German statesmen at the outbreak of the war frankly asserted that to win the war the German armies must drive swiftly to the heart of France and bring that country to her knees before Russia should have time to mobilize and become a pressing danger on the east. In the German plan no route of invasion was practicable which would impose on the advance any appreciable delay. German and Austrian heavy artillery might account for the permanent fortifications of Belfort within reasonable time once they were fairly under fire; but the topography favored a long and obstinate defense from field works, which would perhaps prevent the big guns from coming within effective range of their objectives. The Belfort gateway might become the scene of important subsidiary operations, but German necessities required a topographically more favorable route for the main invasion.

The Lorraine gateway

The Lorraine gateway is broad and since the war of 1870, largely in German territory. Metz is an admirable fortified base and is connected with Strassburg by excellent rail communications. It was by this route that the Prussian armies passed in the former war, whereas at the gate of Belfort they knocked in vain. West of Metz the German border is closer to Paris than at any other point. Here, then, would seem to be an appropriate point from which to launch the main attack upon the French capital.

But to reach this conclusion is to forget the surface configuration of the Paris Basin. Just over the French border is the broad, marshy plain of the Woevre. Dominating it

on the west is the steep escarpment crowned at short intervals by permanent fortifications from Verdun to Toul, and offering exceptionally advantageous positions for temporary field works commanding the plain below. At the two points mentioned the only practicable gateways through the barrier are heavily fortified. Beyond to the west the same unfavorable topography is repeated again and again; always a steep scarp toward Germany, commanding a plain over which the invading troops must advance; always a gentle back slope down which the defending armies might retreat to the next scarp if too heavily pressed, while rear-guards on the formerly occupied crest held the invaders temporarily at bay. If victorious along one plateau scarp, the invading armies would be checked at the next and compelled to fight the battle anew. Delays at the fortified gateways must be expected even if the forts were invested and the main armies pressed on to the barrier next west. Narrow and few in number, the gateways afford insufficient lines of communication for vast armies advancing and fighting, while the construction of new roads suitable for heavy traffic up the escarpments and over the plateaus would be an engineering feat involving an enormous expense in labor and time.

**Natural defenses facing the Lorraine gateway**

Clearly the route from the middle Rhine country westward into France must be eliminated as the main path of invasion in a campaign demanding rapidity of action as its chief object. The failure of the Crown Prince's army to break through the gateway at Verdun, the failure to capture the plateau crest west of the Woevre, and the failure to secure the Nancy gateways and reach the Gap of Toul are sufficient vindication from the military standpoint of the German Staff's determination to avoid the difficult terrain of northeastern France and the delays it would inevitably impose on military operations. The belt of fortifications alone would probably have weighed but little in the Teuton

**The first route impracticable**

plans. Their confidence in their heavy artillery was supreme, and was fully justified by the speedy fall of every fort coming effectively under its fire. But the defenses of Nature cannot be blasted away by the devices of man, and it was these defenses and not the permanent forts which saved Nancy, Toul, and Verdun.

Second route of invasion

A second route of invasion is from the northeast, following the course of the Moselle trench to Luxemburg and thence into France by way of Longwy or Metz. Such an advance could base on Coblenz and Trier, and would in the one instance involve the violation of neutral Luxemburg, and in the other bring the armies to the same advanced base (Metz) used by the troops moving west from the middle Rhine. In either case the further progress of the armies would encounter the same difficult terrain of the Paris Basin, which rendered impracticable the first route, as described above. Large armies must undoubtedly push through the Lorraine gateway, capture the important iron deposits within easy reach of Metz, and forestall any attempt of the French to invade Germany by this route. But the main striking arm of the German military machine must operate along some other path.

Third route of invasion

To a lesser degree the route from Cologne, around the north side of the Ardennes, past Aix-la-Chapelle, and so to the trench of the Meuse through the mountains, is open to the same objections. Once the invaders were in French territory the plateau scarps could be crossed near their western extremities where they constitute less formidable obstacles. Nevertheless the terrain is far from favoring a speedy advance on Paris. The scarps are sufficiently pronounced to give commanding artillery positions and to restrict free movement to a limited number of gateways. The innermost line of cliffs is especially forbidding, and its gateways are guarded by the fortifications of La Fère, Laon,

Rheims, and Soissons. Moreover, to conduct the main offensive with its principal line of communications a single railway running back through a narrow mountain gorge in hostile territory would be inadvisable if more favorable conditions could be found a short distance to the west. The "army of the Meuse" was, therefore, destined to play a subsidiary rôle in the invasion.

**Fourth route of invasion**

There remains the fourth route, by way of the Belgian plain. Entering, as before, by the Liège gateway, invading armies could spread westward around the northern side of the Ardennes, through Louvain and Brussels, swinging gradually southwest past Mons and Charleroi, Cambrai and Le Cateau, on past St. Quentin, and so down to Paris. The left flank could profit by the Sambre-Oise valley route, while the right flank could swing as far out over the plain as circumstances required. The pathway here is broad and level and no topographic obstacle bars the way. It is a route which enables an invader to take in the flank the entire series of plateau barriers farther east. Roads and railways are excellent and numerous, permitting the rapid simultaneous advance of different columns of troops. The country is fertile and highly productive, providing sustenance for large armies. With the occupation of this route would go the conquest of deposits of coal and iron of immense importance to the invaders. Back of the armies operating in France would be a broad network of first-class lines of communication and supply. Assuredly of the four possible routes of invasion this is the one incomparably the best so far as its physical characteristics are concerned.

**Objections to the fourth route**

There existed, however, some serious objections to an advance on Paris by way of the Belgian plain. The distance from the nearest point on the Franco-German boundary, near Metz, to Paris is about 170 miles as the aeroplane flies. From the German-Belgian border to Paris, via the

Belgian plain, the distance is approximately 250 miles. The latter route is, therefore, nearly fifty per cent. longer than the legitimate route directly from German territory into France. Not only this. The longer route involved the violation of Belgian neutrality, and if Belgium and England were faithful to their treaty obligations and true to their national honor, must inevitably bring the Belgian army and the British army and navy into the field against the invader. Yet this was precisely the route over which the great mass of the German armies were hurled. The smooth Belgian plain was to serve as the slot along which the German bolt should reach the heart of France.

**Military necessity demanded the fourth route**

Surely the choice of an invasion through Belgium must have been dictated by some very compelling reason to justify it in the minds of the German General Staff. That reason is to be found in the topographic features of western Europe which rendered a swift advance on Paris impossible from the east, but comparatively simple from the north over the broad pathway of the Belgian plain. "He who is menaced as we are can only consider the one and best way to strike," said the German Chancellor. "Belgian neutrality had to be violated by Germany on strategic grounds," cabled the Kaiser to President Wilson. Military Necessity, the one true god of the Prussian autocracy, demanded the speedy death of France; and to gain the one secure route to the heart of the victim, German honor and Belgian peace were sacrificed on the altar of Prussian militarism.

## CHAPTER III

## THE INVASION OF FRANCE

### *The Advance*

Attack on the Liège gate

On the afternoon of the 4th of August, 1914, there appeared at the mouth of the Liège gateway small bodies of German troops. The first important operation of the great war was to shatter the defenses of this narrow pass and gain admittance to the Belgian plain. The gateway is only a dozen miles in breadth, and the forts of Liège effectively command the railway lines which converge to pass through it before spreading out again on the plain beyond. Evidently the gathering hosts of the Kaiser could not fling themselves over the plain upon France until the advance guard had opened the gate.

The gate opened

A few days later the city was entered, but most of the forts held out. A cavalry screen pushed through the gateway and advanced westward over the plain; but lacking proper support it was forced on the 13th to make a partial retreat before the brave little Belgian army. The battle for the possession of the pass was not yet decided, and in the meantime troops and supplies were congested at the entrance awaiting free passage before the real invasion could seriously commence. The delay was becoming dangerous, for the advantages to be reaped from a sudden sweep over the plain might be lost through failure to gain prompt admission to its level surface. Finally on August 14th or 15th, eleven days after the struggle for the gateway began, the westernmost fort, Loncin, with General Leman, the heroic de-

Old forts at Namur guarding trench of the Meuse River through the Ardennes Mountains.

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Gorge of the Meuse River at Dinant, showing steep rocky sides of the gorge, the flat character of the upland, and the old fortress of Dinant.

fender of Liège, fell into German hands and the sweep toward Paris began.

**Allies select terrain for first battle**

Meanwhile, the French and British were taking advantage of the delay imposed by geographic conditions at the entrance to the plain, in order to prepare for the shock which would quickly follow the debouching of the main German armies through the gateway. Instead of setting themselves athwart the course of the main German advance over the plain, they selected a topographically more favorable position in the northern foothills of the Ardennes. This position possessed at least three notable geographic advantages: it occupied and, therefore, completely blocked the Meuse and Sambre passageways through the Ardennes; it was defended in front by the gorge of the Sambre from Namur to Charleroi, and on the right flank, the flank next the advancing Germans, by the deeper gorge and larger stream of the Meuse; and it flanked the course of the German advance, compelling the invaders to turn and fight on a line selected by the defense, since they could not continue over the plain with their flank constantly exposed to an Allied attack from the hills.

**Terrain of the battle of Mons-Charleroi-Namur**

Let us look more closely at this first strategic position of the Allied armies. The main front faced north, and from Mons to Charleroi was constituted by the British Expeditionary Force, while the French 5th Army continued the line from Charleroi to Namur. Unfortunately the British had in front of them no protective topographic barrier of importance; but for all or most of its length the French 5th Army lay behind the gorge of the Sambre. In this portion of its course the Sambre is a strongly meandering river, which follows a winding trench cut 300 feet or more below the upland surface. The flat floor of the trench is 500 or 600 yards in breadth, and covered with open meadows. As a rule the southern wall of the trench is steep and for-

**Sambre trench**

ested. An enemy advancing from the north would find it difficult to cross the exposed meadows, bridge the river, and dislodge the defenders from the wooded heights beyond.

Gorge of the Meuse

With the Allied front facing north along the line of the Sambre, there was, of course, danger of a flank attack by German troops advancing from the east. Fortunately as a protection against this danger the main gorge of the Meuse

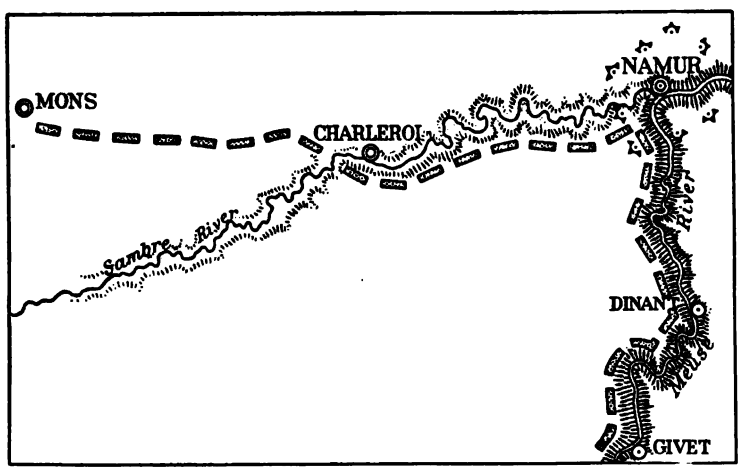


**Figure 2. Main defensive position of the Allied armies at the battle of Mons-Charleroi-Namur.**

was admirably located, and behind this natural moat lay the French 4th Army extending from Namur southward past Dinant to the fortress of Givet. This stretch includes the most formidable part of the Meuse trench. Less strongly winding than the Sambre, it is cut deeper below the Ardennes upland and has steeper walls. The river is deeper and broader, and practically fills the bottom of the trench. Precipitous cliffs of bare rock rise in places several hundred feet from the water's edge. Where the slope is less steep the walls are heavily forested. Without question this is the most formidable obstacle in the Ardennes district.

It will be seen that the combined Allied fronts formed a salient with both sides protected by topographic barriers of imposing magnitude, but with the apex thrust far out toward the advancing Germans. This apex being the junction of two principal natural pathways through the mountains, it was the locus not only of an important town, but also of the most valuable crossings over the two rivers. The strategic value of Namur was thus very great, and for its protection there had been constructed a ring of modern forts. Located at the junction of the north-facing and east-facing Allied armies, and guarding passages across the rivers, which, if captured by the enemy, would enable him to breach both topographic barriers and flank both armies out of their positions, it is clear that fortified Namur was the key to the Allied defense. The fortress was, moreover, the solid support upon which the right of the main Allied front rested in supposed security.

The protected Namur salient

On the 20th of August the German artillery opened fire on the forts of Namur. At the same time the German infantry had wheeled south from the plain to attack the main Allied front behind the Sambre, while the French 4th Army behind the Meuse was also feeling the enemy pressure. It now developed that the Allies had made some fatal miscalculations. In the first place they had woefully underestimated the enormous strength of the German invasion by way of the plain. Overwhelming masses of the best Prussian troops were hurled against the Sambre barrier, while the heaviest attacks of all were concentrated on the more remote but topographically unprotected western end of the line. At the eastern end the forts of Namur melted away with incredible rapidity under the German fire. Less than twenty-four hours after they opened fire, German troops entered the city, and the next day controlled the vital passages over the Meuse and Sambre. On August 22d the defensive line of

the Meuse-Sambre trench was abandoned, and there began the retreat which was not to end till the stage was set for the Battle of the Marne.

**Enveloping movement through the Belgian plain**

The phenomenal sweep of the German armies across the Belgian plain into northern France now proceeded apace. Von Kluck's great army swung far to the west and south, through Tournai, Arras, and Amiens, overlapping the western end of the Allied line and constantly threatening to envelop it. The infantry advancing by parallel columns on different roads, and supplied by an efficient motor transport service, moved swiftly over the smooth surface. Ceaselessly pressed by the extreme rapidity of the German advance, the British army withdrew southwestward into France, along the margin of the plain just west of the Oise valley, turning to face more and more toward the northwest in order to defeat Von Kluck's efforts at envelopment. In time this brought the British contingent into a position parallel to the Oise valley, and the heart-breaking retreat was first checked when the exhausted Expeditionary Force put this important barrier between itself and the pursuing Germans on a line from Noyon to La Fère. Not before this had the plain offered an obstacle sufficiently serious to check the pursuit and afford the pursued a real breathing space. Here was a fairly large river meandering excessively through a series of marshes on the flat floor of a broad valley, with the wooded hills of Noyon protecting the left end of the line and the fortress of La Fère at the right. Although not a defensive barrier of the first importance, it offered temporary security. Meanwhile the French were falling back toward a concave line running from Paris to Verdun, in preparation for the offensive which was to bear the name of the Battle of the Marne.

**Oise valley barrier**

Thus far the assault through the plain of Belgium had succeeded beyond measure. Germany had moved an in-

*Central News.*

**A typical scene on the flat plain of Flanders.**

*American Press.*

**The level plain of Belgium, across which the main German advance on Paris was launched. Note the intensive cultivation of the plain and the network of roads. In the distance is the town of Audegem, burning as a result of artillery fire.**

credible number of men at an incredibly swift pace across the low, level pathway into France. The Allied armies were in peril from the swift swing around the western end of their line, and it was believed Paris would soon fall before the heavy guns moving rapidly southward over the plain. Fate seemed about ready to set the final seal of approval upon Germany's choice of the topographically most favorable route into the enemy's country.

### *The Battle of the Marne*

The plan of battle

In its simplest terms the Battle of the Marne consisted, on the part of the Germans, in an attempt to swing round the western end of the Allied line and envelop it from that direction, at the same time breaking through the Allied center far to the east and forcing the remainder of the western half of the line back on Paris, thereby completing the process of envelopment and creating a second Sedan on a grand scale. On the part of the French the intention was similar: a flanking movement around the west end of the German line, and a break through their center, which should split the invading forces, thus insuring the complete envelopment or precipitate retreat of the western half. It is notable that of these four movements the two flank attacks were begun on the plain north of Paris, while the two attempts to break the enemy's center were staged on the low plain of Champagne. Only subsidiary movements consequent upon the main efforts were assigned to the troops operating over the more difficult topography of the intervening plateau with its deep cut river trenches.

Minor rôle of the Marne River

Let us follow, in outline, the chief events in this most important battle of the war, noting as we go the rôle played by the surface features of the country over which two vast army groups were contending for a victory which should, in all

likelihood, determine the course of world history for many centuries to come. Although called the Battle of the Marne, the trench of this important river cannot properly be said to have played a determining rôle in the issue of the struggle. Only once, in fact, were the opposing armies aligned on opposite sides of this natural barrier for any great part of its length, and then only for a brief space of time. It was the battle of the plateau of the Marne and of the Marne River and its tributaries, including especially the Ourcq, Petit Morin, and Grand Morin; and the final issue was in fact determined on the low plain of Champagne farther east. Maps of the battle line at critical stages in the engagement usually fail to show that striking parallelism between army positions and topographic features which most readily gives one an appreciation of the influence of land forms on military operations. But it would be a serious mistake to draw from this the conclusion that such influence was any the less real.

**Joffre's strategic retreat to favorable terrain**

The Battle of Liège gave the Allied armies time to assemble in the triangle guarded by the Sambre and Meuse gorges. The Battle of Mons-Charleroi-Namur, in its turn, was not expected by the Allies to accomplish the impossible task of crushing the German armies, but was designed to afford time for troops to assemble farther south, where the final struggle might take place under conditions more likely to bring decisive victory to the Allied arms. Joffre's strategic retreat not only lengthened out the enemy's lines of communication through many miles of hostile territory, but compelled the German generals to leave behind them enormous forces to guard strategic passes over or through topographic obstacles, to mask fortresses which, like Maubeuge, guarded valley routes into France, and to rebuild bridges over marshes and river trenches. The retreat brought the enemy into the plateau country of the Isle of France, where

the east-west gorges would impede the advance, and where the final struggle would take place with these obstacles in the enemy's rear, hampering his supply system and threatening his retreat in case of disaster.

**Von Kluck's enveloping movement on the plain**

Swinging west through Belgium and south into France, Von Kluck, with the main striking arm of the German forces, had, by the first week in September, traversed the level plain almost to the gates of Paris. The time had now come, in the opinion of the German high command, for Von Kluck to ignore the small French forces to the west and the exhausted British Expeditionary Force in front of him, and to strike boldly southeast, get in behind the Allied line east of Paris, and envelop it by a flank attack. The Allied center was already bent in dangerously, and might be broken at any moment. There followed that spectacular sweep of Von Kluck's army from the northern gates of Paris east and south across the Marne, a movement which surprised and puzzled those who looked for no check until the city itself was in German hands. But the destruction of the French army, not the mere occupation of the French capital, was the logical goal of the German General Staff; and this goal could only be reached by the envelopment of the enemy's line. This enveloping action was now fully under way.

**The French counter-move**

The moment had arrived for the French to strike their blow. Within the circle of the Paris forts, and to the west and south of the city, a new French army, the 6th Army, had secretly been assembled. Waiting until Von Kluck had crossed over to the south side of the formidable Marne trench, still patiently waiting until he had also placed the trench of the Grand Morin in his rear, the French 6th Army at length fell on the thin screen of troops he had left west of the Ourcq to protect his flank, and began the process of cutting the lines of communication in his rear. Under pressure the German screen fell back slowly toward the

trench of the Ourcq, where they might hope to find protection for a stand against the superior French forces. The army which was seeking to envelop the Allied line, was itself in grave danger of being enveloped.

At this point the Germans showed marked skill in turn-

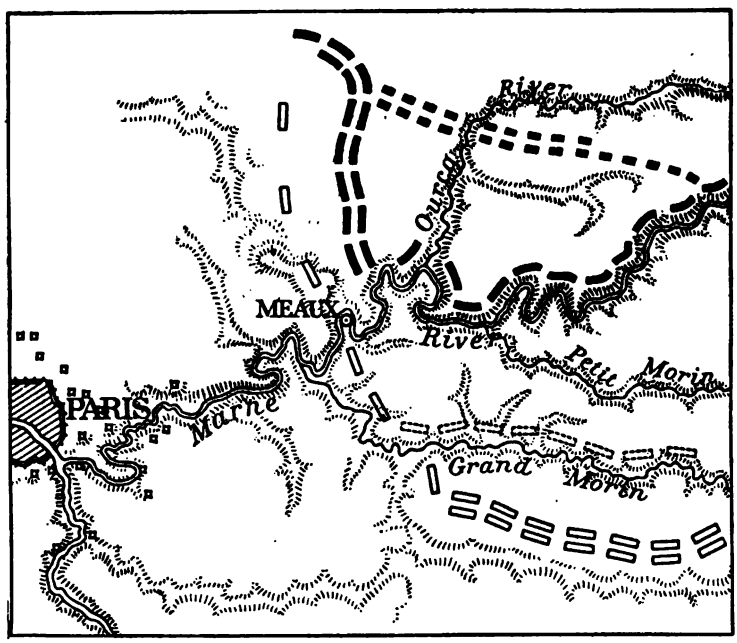


**Figure 3.** Approximate German positions at the battle of the Marne. Solid line open rectangles: Mass of German armies south of Grand Morin, thin screen of troops facing west to protect right flank, at beginning of battle. Broken line open rectangles: Rearguard defending passage of the Grand Morin while bulk of troops are being shifted north to meet French attack on flank. Black rectangles: Main army facing west and seeking to envelop north end of French line, while screen of troops defends crossings of the Marne trench. Black dots: German armies withdrawing up the valley of the Ourcq.

**Defensive value of the Grand Morin valley**

ing the obstacles, which might have hampered their retreat, into defensive barriers against the Allied pursuit. How far this was due to failure of the British to press Von Kluck with unrelenting vigor cannot now be stated, but the fact

remains that he was able to withdraw his forces north of the Grand Morin, leaving a rearguard of troops along that trench to hold the pursuers at bay, while he sent the bulk of his forces back north across the Marne to retrieve the disaster threatening his exposed right flank. Facing west and southwest against the French 6th Army, Von Kluck began to drive them back. In this new position his left flank was exposed to the British, with only the thin rearguard along the Grand Morin to serve as a protection. For precious hours the Germans tenaciously kept this steep-sided, flat-floored trench between themselves and their foe, while Von Kluck was redressing the balance farther north in favor of the invaders.

**The battle for the Marne trench**

At length the British forced the crossings of the Grand Morin and the German rearguard fell back to the Petit Morin and then to the main great trench of the Marne. For a short time this trench now became the most important factor in the struggle. If the German rearguard could hold it some hours longer Von Kluck would be left unmolested to destroy the French 6th Army with his superior forces, the Allied line would be turned, and the war won by the efficiency of a militaristic autocracy. If the British forces could cross the trench without delay they could roll up Von Kluck's left flank and decide the battle, perhaps the war, in favor of the Allied democracies. Great issues hung in the balance along that natural moat on the afternoon of September 9th.

**The crossing of the Marne**

Nature gave a clean decision to neither contestant. The obstacle was not sufficient to hold the British in check long enough for Von Kluck to complete the destruction of the French 6th Army. On the other hand the British found it impossible to cross the barrier at once and involve Von Kluck's flank in disaster. According to reports they negotiated the obstacle first toward its eastern end where it is

of smaller dimensions, and only later crossed its western reaches. The delay gave Von Kluck opportunity to swing his right flank back toward the Ourcq and withdraw it up that valley, so as to face more nearly south toward the oncoming British.

**Terrain at the St. Gond marsh**

At this moment there was in progress farther east a phase of the Battle of the Marne in which natural topographic barriers were playing no less important a rôle than in the operations just described. If the reader will turn again to the diagrammatic sketch, opposite page 4, he will see that the Petit Morin rises in the long east-west belt of the St. Gond marsh, and flows directly west through its gorge in the Marne plateau. We thus have an east-west barrier of no mean importance consisting of a marsh at one end and a river gorge at the other. It was along this barrier that the Battle of the Marne, and hence the issue of the war, was finally decided.

**Deadlock at the marsh**

While the British were struggling to cross the trenches of the Grand Morin and Marne farther west and assault Von Kluck's flank, the French and German forces faced each other across the St. Gond marsh and the Petit Morin gorge. By September 8th or 9th the French had been able to dislodge the Germans from the north side of the gorge, west of the plateau scarp, and drive them northward in hurried retreat. At the Marne the German armies paused, expecting to check their pursuers with the aid of the imposing river trench; but the impetuous French assaults carried them beyond the northern wall before German reinforcements could be brought up to hold the advantageous position. Farther east, however, the battle line curved southward and at the east end of the Petit Morin gorge and along the marsh the opposing forces were, for a time, deadlocked. French efforts to push northward across the gorge and occupy the heights beyond were checked,

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**First line of east-facing escarpment east of Paris, covered with vineyards. The view is taken near Epernay.**

**The marsh of St. Gond at the foot of the first escarpment. The few routes through the marsh were rendered impassable by destroying the bridges.**

while the marsh remained practically impassable for both armies.

Then began the final German attempt to smash through the French center. The assault progressed successfully across the dry ground beyond the east end of the St. Gond marsh, but back of the marsh and Petit Morin gorge the French line held firm. To increase the force of the blow farther east the German armies north of the marsh were seriously depleted. At the same time the German line in this vicinity may have been stripped of men to assist Von Kluck out of his troubles farther west. The difficult nature of the marsh was relied upon to protect the weakened German line. The French commander, General Foch, saw his opportunity. A thin screen of German troops behind the marshy barrier might, indeed, hold that part of their line secure. But Foch could strike with effect close to the east end of the marsh, where a strong German army connected with the thin line back of the obstacle. This junction was a point of weakness, especially when southward progress of the German offensive left an opening here which the depleted forces north of the marsh were unable to close. Here Foch struck with all the fury of the proverbial offensive power of the French army. To get the men for the stroke, he withdrew an army corps from behind the Petit Morin gorge, near the edge of the plateau, where the difficult nature of the topography made the withdrawal comparatively safe. The stroke was a brilliant success. The French armies smashed through the gap. The German center was broken, and the German retreat to the Aisne began.

**Rôle of St. Gond marsh in the battle of the Marne**

### *The Battle of the Aisne*

The great trench of the river Marne is the most imposing topographic barrier in the plateau of the Isle of France. We should expect that behind its protection the German

armies in retreat would make a desperate effort to halt their pursuers. Such, indeed, was the case. But the Marne trench was too close to the field of battle; it was, in fact, as we have seen, involved in one of the principal actions at the west. There was no space to manœuver, no opportunity so to order the retreat that the retiring forces would arrive at the barrier in such dispositions as would enable them to align themselves along the northern bank without confusion before the pursuers could break across at one or more points and flank them out. The British forced a crossing east of the mouth of the Petit Morin and the French broke through farther east, at a time when the Germans had retired north of the Marne near Meaux, and were still far south of it in the direction of Epernay. The German line crossed and recrossed the barrier, instead of paralleling it on its northern side. Desperate efforts were made to hold the trench in different sections, but here the French or British broke over with an impetuous assault, there the secure positions were outflanked by crossings made elsewhere. The retreat continued, and the whole valley of the Marne passed into French hands.

**German failure to halt at the Marne trench**

Northward there is not a single continuous trench from east to west until the valley of the Aisne is reached. Here, however, is a military obstacle of capital importance. Entering the plateau by a gateway near Rheims, the river flows directly west to join the Oise at Compiègne. For forty miles the great, straight trench cleaves the plateau, its steep walls leading abruptly down to a flat floor several hundred feet below, over which the narrow but deep river pursues its meandering course through grassy meadows. In the edge of the plateau above are extensive quarries and vast subterranean galleries and chambers, left by the excavation of a limestone much used for building purposes. Patches of forest clothe the valley walls and are scattered over the up-

**Terrain of the Aisne valley**

Flooded floor of the Petit Morin valley, a tributary of the Marne which played an important rôle in the struggle.

The flat-floored valley of the Marne River in the vicinity of Meaux.

land surface. It was a foregone conclusion that the Germans would make every effort to stop their retreat along this natural defensive barrier.

About the 12th or 13th of September the main German armies arrived at the line of the Aisne, closely pressed by the French and British. Crossing to the north side the Germans destroyed the bridges behind them, and turned to pour a hurricane of steel into the valley. From trenches

**French pursuit halted at the Aisne trench**

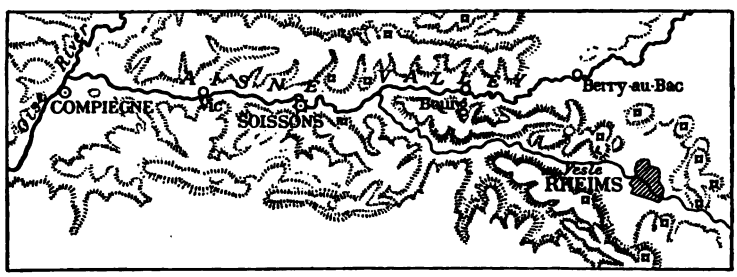


**Figure 4. Trench of the Aisne River.**

along the valley walls and on the plateau crest, from open quarry and cavern mouth, from every bit of woodland cover, machine guns and artillery rained death upon the meadows below, where in exposed positions the French and British pursuers worked feverishly to build pontoon bridges and rafts with which to cross the unfordable river. Heavy rains had been falling and the flood waters made the task doubly difficult and dangerous. Every advantage of Nature lay with the invader. If he could not stop the pursuit here and hold the rest of northern France in his grip, he could hardly hope to pause again till the hills of the Ardennes had been reached.

From Soissons west to the Oise valley the French crashed against the barrier with an impetuous assault which carried them through the hail of steel and over the flooded Aisne. At the foot of the northern valley wall they paused to regain

**French and British efforts to cross the Aisne**

their breath. East of Soissons to Berry-au-Bac, the British met with less success. Baffled at first by the combined defensive of Nature and man, they at length made a few precarious crossings. The morning of September 14th found the French over the stream and ready for an attack upon the steep northern wall of the trench; while the British had attained the northern bank only in places. The situation was not ideal for a further offensive, but time was precious; the odds were becoming greater every hour as the Teutons dug in more and more firmly along their naturally strong position.

**Allied failure to breach the Aisne barrier**

An immediate assault on the plateau was ordered. Up the steep valley walls, and out over the plateau to the north swept the invincible Frenchmen. Night found the trench of the Aisne behind them, although the highest crests on the plateau were yet in the hands of the Germans. Farther east the British were still held at bay south of the trench for several-mile stretches east of Soissons and again east of Bourg. The French, unsupported by a corresponding British advance on their right, and with their lines of communication imperiled by a flooded river in their rear, were unable to hold their gains. In a day or two they were pushed back to the river, and the Battle of the Aisne was decided in favor of the Germans. The great moat, made formidable by Nature and skilfully fortified by man, had proven too much for the offensive power of the Allied armies. The mobile war in the west was ended, and the war of the trenches had begun.

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Official French photograph of a part of the Somme battlefield taken from an aeroplane, showing ruined village of Soyecourt and the system of trenches then occupied by the Germans. Note the numerous shell craters and the smoke of bursting shells.

# CHAPTER IV

## THE DEADLOCK

### *The Battle of Nancy*

Terrain of the "Grand Couronné"

WHILE the sweeping movements involved in the Battle of the Marne were in progress in the west, the war of fixed positions was beginning farther east. The Germans massed in the Lorraine gateway were making their first great attempt to smash the outer line of the natural defenses of Paris. As can be seen from the sketch opposite page 4, Nancy guards a double gateway through the easternmost plateau scarp. The crest of the escarpment, a line of heights overlooking the lowland to the east, is known to French military writers as "le Grand Couronné." Along this crest the main positions of the French armies, under General Castelnau, were located, taking skilful advantage of a topography extremely unfavorable to the Germans. To defeat the French armies and capture the first plateau belt with the Nancy gateways, was the object of the Battle of the Grand Couronné, or as it is popularly known, the Battle of Nancy.

Assaults against the escarpment

Not far from 400,000 highly trained German troops were massed on the lower land in the course of the battle, and hurled against the wooded plateau scarp. French infantry in greatly inferior numbers intrenched along the higher levels, and French artillery concealed in folds of the undulating upland ground, in ravines cut back into the escarpment face, and in patches of woodland, poured their combined fire upon the assaulting columns below. In front of the main scarp are outlying mesas and buttes, erosion rem-

nants which, like the positions on the main crest, command a wide field of fire. Wave after wave of the grey-clad invaders in mass formation swept up the lower slopes of the Grand Couronné, withered away under the merciless hail of steel from the heights above, ebbed back to the lowland again in weakened currents, leaving a gray mark on the plateau face to mark the highest reach of each impotent wave.

**The impregnable barrier**

Day after day the slaughter went on throughout all the first third of September. The myth of German invincibility died hard; the impregnability of Nature's best fortifications, when manned by Frenchmen, was a hard lesson to learn. Forty thousand German corpses at the base of the scarp, one-fourth of the attacking forces on the casualty lists; such were the results of the Kaiser's introductory study of the natural defenses of Paris. Not, however, until he had pondered the bloody chapters of Verdun did he fully realize that the topographic barriers, which he well knew to be difficult, were, as a matter of fact, impregnable.

### *The Battles of Verdun*

**First assault on the Verdun-Toul scarp**

On the 20th of September the German armies made their first serious attempt to break through the Verdun-Toul escarpment. The French line, pivoting on Verdun, swung far to the south on either side. If the eastern limb of the salient, along the plateau scarp, could be broken, the troops defending the western limb would be taken in the rear and Verdun isolated. The eastern limb was held by a comparatively thin line of French troops who depended upon the strength of the topographic barrier to maintain their positions. Occasional permanent forts along the crest added their measure of strength, although the known weakness of such fixed points had led the French to transfer many of the

big guns to outlying field fortifications located with regard to the favorable configuration of the terrain.

Relation of terrain to the San Mihiel salient

From the low plain of the Woevre the waves of German troops were hurled westward against the escarpment. The slaughter was terrible, but for a moment German hopes ran high. Some miles south of Verdun the scarp is broken down by erosion, and through several low passes one may quickly reach the Meuse River. Here the Germans secured a foothold on the eroded plateau, and brought their heavy artillery within range of several of the southern forts. Fort Camp des Romains quickly crumbled to ruins under the rain of heavy explosive shells. The Germans crossed the river and established themselves in St. Mihiel. A general assault on the long escarpment had succeeded at the point topographically most favorable to the attacking troops, but had failed elsewhere. There resulted the famous "St. Mihiel salient," which was to persist through several years of strenuous warfare. The partial success of the German armies could not be pushed to victory so long as the more formidable positions of the plateau scarp remained in the hands of the French.

Plan of the main battle determined by the terrain

The struggle which will go down in history as "the Battle of Verdun" was not to begin until some months later, when the opposing armies had been long deadlocked in the war of the trenches. Struggles, which in previous wars would have counted as important battles, had shown that Verdun could not be taken except by military operations conducted on a colossal scale. On such a scale Germany prepared for her greatest effort of the war. The accumulations of munitions, and the massing of men and guns exceeded anything previously dreamed of. The main attacks were made from the north. Entering the escarpment by the broad open gateway cut obliquely through it by the Meuse River north of the city, the German armies had already spread out on both sides

of the valley, occupying cross ridges between some of the east-and-west trending branch ravines. An advance southward across these successive ridges was deemed more feasible than an attack from the east against the main scarp, although operations from that direction should accompany the major movement.

**Germany's failure**

It is not necessary to repeat the history of the great German disaster: the surprise attack from the north with much ground gained the first day; the slower advance of the days that followed and the eventual capture of a few northern forts; then the deadlock with week after week of incessant slaughter of the attacking waves, first on one side of the river then on the other; the withdrawal of the French to the base of the scarp when German guns on the heights farther north dominated their positions in the Woevre plain; the failure of the Germans to ascend the steep scarp; finally the smashing French counter offensive, in the form of sledge-hammer blows at long intervals, each blow sending the invaders reeling back to the north; half a million of Germany's finest troops sacrificed in the fruitless endeavor to capture the Verdun gateway and conquer the second easternmost belt of the natural defenses of Paris.

**Natural defenses of Verdun**

The French victory at Verdun was not won by the permanent fortifications. These had been stripped of their great guns in order to enable the French to hold the favorable topographic positions farther out from the city. The plateau scarp is of limestone, and quarry openings and caverns played their part in the defensive scheme. But most important of all were the east-facing escarpment, and the endless series of east-west ridges with their intervening parallel ravines, draining toward the Woevre plain on the east or into the Meuse River on the west. Dead Man Hill and Pepper Ridge, Hill 304 and the Côte de Talou, now historic points on the map of France, were formerly un-

important ridges, lost in the maze of similar crests which characterize the dissected plateau belt. Their defensive value lay in the fact that each crest dominated a ravine next

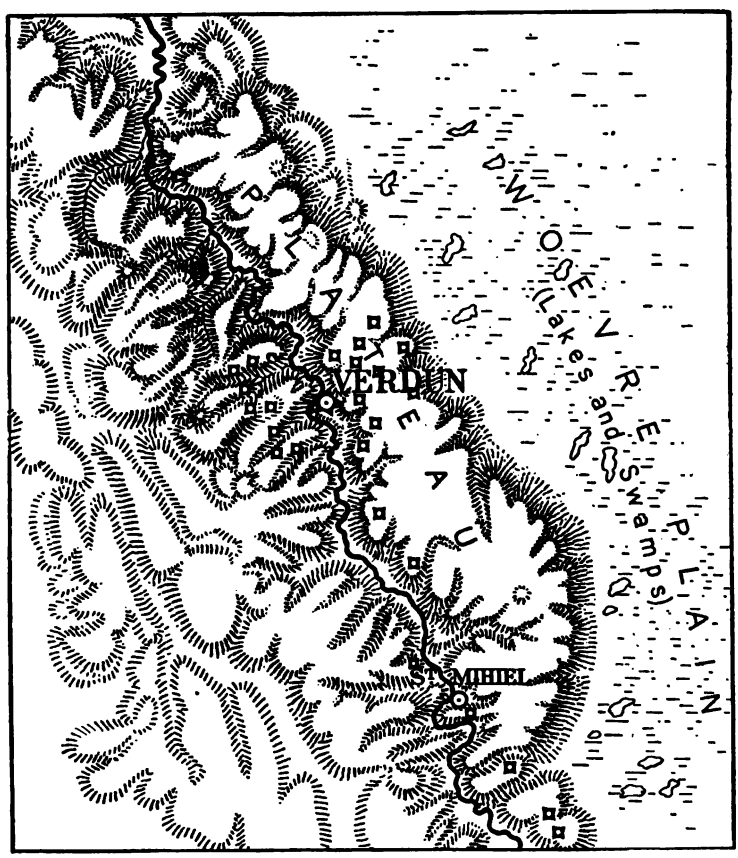



Figure 5. Terrain of the Verdun district.

north across which the Germans must advance in their assaults toward the south; and in the further fact that in the maze of ridges artillery positions could be found which commanded practically every avenue of German approach.

**The Meuse barrier**

Another topographic element of great importance in the defense of Verdun consists in the peculiar character of the Meuse valley. The trench of the river is broad and flat-floored, and in wet seasons interposed a marshy and muddy barrier between the two wings of the attacking Germans. The shifting of troops from one side of the river to the other was not an easy manœuver, and attacks made from one side of the barrier could not always be effectively supported from the opposite side.

The Meuse River, moreover, occupies what is known to the geographer as an entrenched meandering valley. From the upland spurs projecting into each curve French guns could dominate the crossings of the river in three directions, and pour their fire upon the German positions on the upland beyond. The successive swings of the valley north of Verdun cause the river to form a valuable defensive screen which the Germans would have to cross at repeated intervals, unless they chose to avoid the obstacle by concentrating their movements east and west of the river zone, thereby presenting better targets for the French artillery. German troops once in possession of the meander spurs have sometimes found themselves in a natural trap. On more than one occasion a swift French counter stroke has been so planned as to sweep across the neck of the meander spur, thus imprisoning large bodies of German troops on a peninsula surrounded on three sides by an unfordable stream. It was by this manœuver that the French made their largest captures of German prisoners.

**Marshy plain of the Woevre**

Attacks on Verdun from the plain of the Woevre were, as already noted, of importance during the main great battle. Determined assaults from this direction would have been highly important, had the nature of the terrain offered any hope of success. But the Battle of Nancy and the first attacks from the Woevre had demonstrated the formidable

character of the great plateau scarp. Furthermore, the plain of the Woevre in winter and early spring, the time when the great struggle was at its height, is practically impassable for large bodies of troops. The soil is a stiff clay which when wet turns minor roads and fields into bogs, while the water resting on its impervious surface forms marshes and ponds without number. Troops and artillery confined to the few good roads of the district would be at the mercy of the French guns, and could not manœuver into positions offering any hope of a successful offensive. The plain of the Woevre and its dominating plateau scarp by forcing the Germans to attack from the north, and the ridges and valleys of the plateau by offering defensive barriers which the Germans could not overcome, saved Verdun to the French.

### *The Battles of Flanders*

German failure to reach the Channel ports

Why the German General Staff should elect to make several of its main efforts to break the Allied line on the low plain of Flanders is a question which cannot be answered with assurance until after the war. Perhaps it was believed that the weakness of the Belgian and British forces defending this line would more than offset the difficult nature of the terrain; that the Allies might count too much on the protection of Nature, and insufficiently support the line. However that may be, in the early months of the war the world was treated to the spectacle of enormous masses of German troops being sacrificed in the hopeless endeavor to break through this line to the Channel ports beyond.

Terrain of the battles for the Channel ports

We have seen that the plain of Flanders is low and wet; so low that the waters of the sea must be diked out at high tide, and so wet that an endless system of ditches must be constructed to drain the marshy soil. Rivers must have their waters confined by artificial levees, and canals of formidable

depth and width add their defensive strength to the naturally difficult terrain.

Against such a barrier the German troops were thrown in great numbers. Fully exposed on the nearly treeless surface of the plain and checked at every step by water and marsh, the waves of German infantry worked painfully forward to melt under the Allied fire. Thousands were drowned in the rivers and canals, while tens of thousands perished on the marshy plain. Still the assaults continued, and forced the defenders to yield, bit by bit, the difficult ground. When nothing else would stop the invaders, the dikes were opened and the whole lower course of the Yser turned into an impassable lake. So ended the Kaiser's best efforts to plant his guns on the edge of the Strait of Dover. The marshes of Flanders were as impregnable as the plateau scarps of the east.

Summary

It is not possible within the limits of this volume to trace in detail the influence of land forms upon all the battles of the great war. That is a task which would require several volumes of the present size. The writer's effort has been rather to show how far such an influence still persists under modern conditions of warfare, and to give, in addition to some special examples of this influence in particular battles, such a general picture of the terrain in the chief theaters of operations as will serve as a basis for more detailed studies of other engagements. For this reason we must forego, for the present, any analysis of the important rôle performed by the marshy valley of the meandering Somme in the battle to which that stream has given its name; of the nature of the topographic obstacles known as Vimy ridge and Messines ridge, and the part they played in two great British victories; or of the chalk ridges of the Champagne plain, and many other topographic features which have given a special character to different contests along the far-

flung western battle line. It will be more profitable to turn our attention to the Eastern front for a time, and see how far the nature of the terrain has controlled plans of campaign and movements of armies in that theater of war.

# CHAPTER V

## THE EASTERN THEATER OF WAR

**Elements of terrain in eastern Europe**

THE vast expanse of territory over which the Russians have battled against the Germans can with difficulty be presented to the eye in a single diagrammatic view. Nevertheless it will materially aid us in following the eastern campaigns if we attempt some sort of graphic representation of the terrain. This has been done in the accompanying illustration (Fig. 6), which shows all except the extreme northern and southern limits of the Russian line when it attained its greatest extension. It will readily appear that the topography covered by the military operations may be divided into four sections: the mountainous belt of the Carpathians on the south; a broad belt of plateau next north which terminates in an irregular but prominent northward-facing escarpment; a vast stretch of level plain extending from Germany through Poland to central Russia; and the hill and lake country of Prussia bordering the Baltic Sea. We may conveniently consider these four elements of the terrain in the order named.

### *The Carpathian Mountains*

**The Carpathian ridges**

Across the southern border of the area the Carpathian Mountains curve eastward and southeastward in a great arc. In the middle portion of their course they consist of a belt of much dissected folded mountains, sixty miles wide, in which long parallel ridges of resistant sandstones remind an American of the folded Appalachians, while

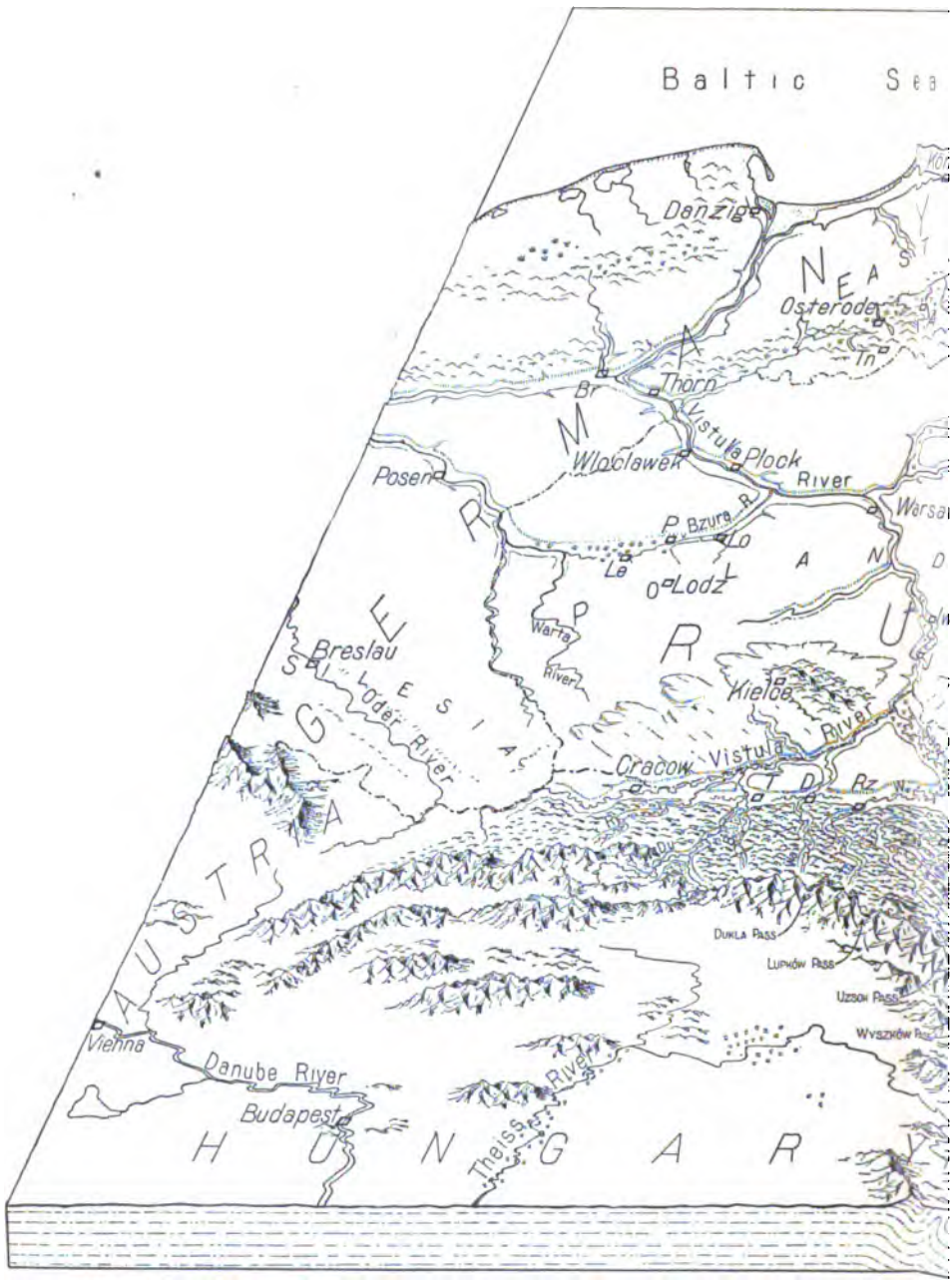
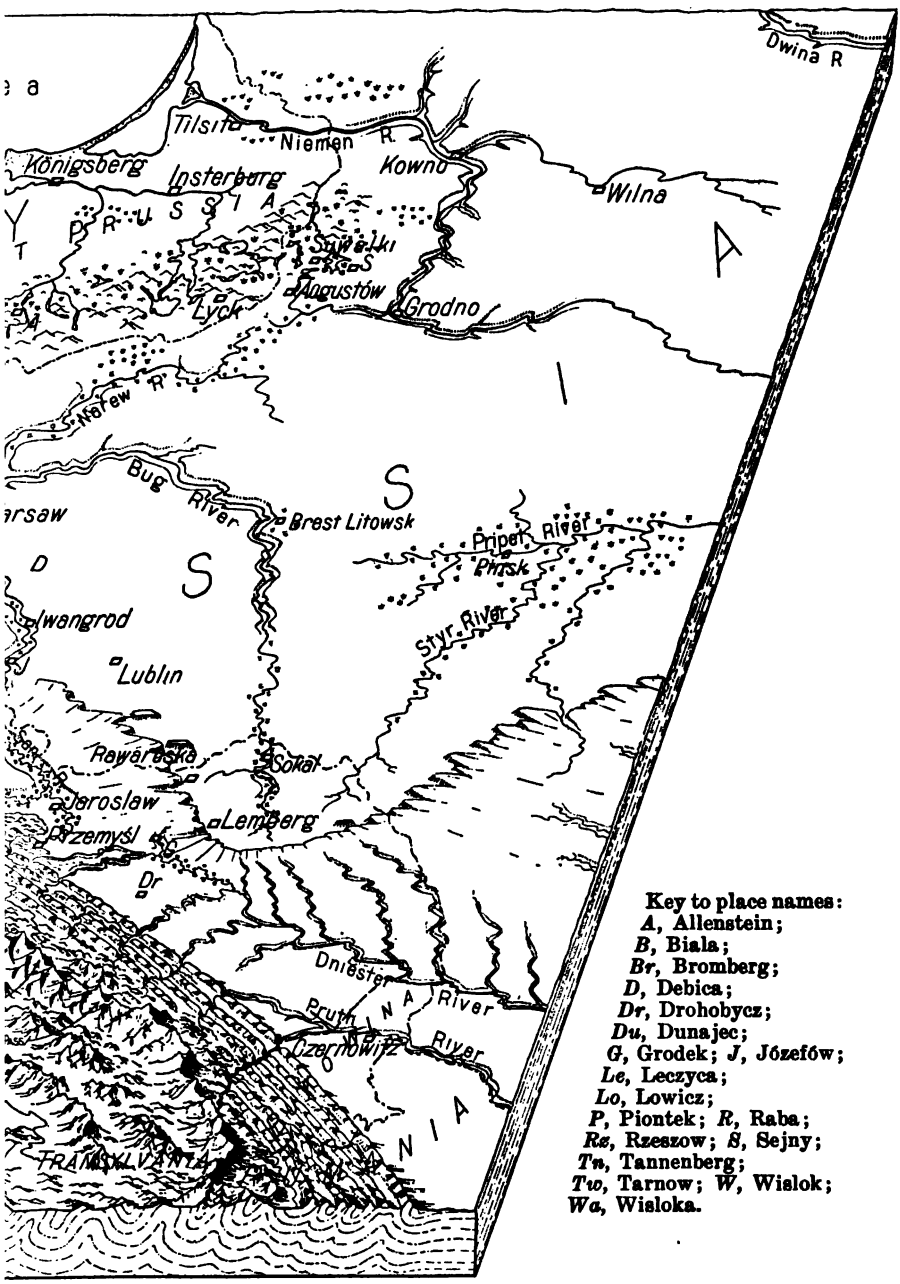



**Figure 6. Diagrammatic view of the eastern theater of war, showing the Carpathian** of Poland, the hill and lake country of East Prussia, the river trenches and marshes, and influenced military operations in the east.




Key to place names:
*A*, Allenstein;
*B*, Biala;
*Br*, Bromberg;
*D*, Debica;
*Dr*, Drohobycz;
*Du*, Dunajec;
*G*, Grodek; *J*, Józefów;
*Le*, Leczyca;
*Lo*, Lowicz;
*P*, Piontek; *R*, Raba;
*Rz*, Rzeszow; *S*, Sejny;
*Tn*, Tannenberg;
*Tw*, Tarnow; *W*, Wislok;
*Wa*, Wisloka.

ın Mountains and their chief passes, the plain and other features of the terrain which have

streams have eroded parallel valleys on the weaker beds. The parallelism of topographic elements is most pronounced along the northeast side of the belt; and the Carpathians differ from the American system in being more massive along the southwestern side, where crystalline rocks appear, while a somewhat irregular crest line of greater altitude separates the two dissimilar areas. Like the American ridges, those of the Carpathians are well forested.

**Strategic passes**

No rivers cut across the crest line in this part of the range, but half a dozen fairly accessible passes, from 1,200 to more than 2,000 feet high, permit roads and railroads to cross from the low plain of Hungary on the southwest to the plains of Galicia on the northeast. Among these we have heard most frequently of the Dukla, Lupkow, and Uzsok passes, because of their peculiar strategic importance. Along the northeastern base of the Carpathians we may note the location of three cities: Jaroslaw and Przemysl near the center of the arc, two important fortress cities, access to which from Hungary is commanded by the three passes just mentioned; and Cracow, another fortified city near the head of the Vistula valley, whence easy gateways open into Austria and by way of the Oder valley into Silesia.

**River barriers of the Carpathians**

Many rivers flow northward and northeastward from the Carpathian crest across the parallel ridges and the Galician plain. Among these transverse streams, the Raba, Dunajec, Biala, Wisloka, and Wislok have fairly open valleys throughout their middle and lower courses in the mountains, and have developed good meanders on the valley floors. The San is the most easterly of the important streams which enter the Vistula, and has an entrenched meandering course until it leaves the mountains at Przemysl to turn abruptly northwest past Jaroslaw as a sluggish river meandering extensively on a broad marshy flood-plain, slightly trenched below the level of the Galician plain. To the southeast the

remaining transverse streams flow in parallel lines to the Dniester, whose upper course meanders on a very broad flood-plain which is even more swampy than that of the lower San; while farther down the river is the deeply entrenched Dniester gorge.

**Piedmont plain**

We should expect that the streams which debouch from the mountains would deposit some of their load of débris and thus tend to build up an alluvial piedmont slope inclining gently away from the mountain base. The topography suggests the presence of such an inclined alluvial plain; but it is evident that its formerly smooth surface has been much dissected by later trenching of the stream courses, and the extent to which the older beds are masked by the alluvium is not clear. The Dniester and San appear to have had their courses determined by the intersection of this northeastward sloping piedmont plain with another southward or southwestward sloping plain described below.

**Difficulties of the Carpathian terrain**

It is clear that the topography of the Carpathians must present a serious obstacle to any advance upon the Hungarian plain by the Russian armies. The parallel ridges are so many giant walls of solid stone erected by Nature against an invader. Each intervening valley is a moat difficult to negotiate under fire from the ridge beyond. The only gateways through the walls are narrow water gaps through which the outflowing rivers escape. Roads and railways must converge to the comparatively few passageways of this type, where the invading armies would be certain to encounter vigorous resistance, with all topographic advantages in favor of the defense. Beyond the parallel ridges are the higher and more complex mountains of the main range. Here practicable passes are few and far between, those carrying railways averaging more than fifty miles apart. Invading columns would have to operate far apart, and cooperation between them in a mountainous region would be

extremely difficult. Transportation of bulky supplies and heavy artillery over the few good roads would be a serious problem. Both roads and railways could be rendered useless by the defenders in a district where high bridges over wild mountain gorges and tunnels through ridges may be effectively destroyed beyond possibility of speedy repair. Winter snows would block the passes and rains and melting snows flood the mountain streams. The curving form of the mountain belt would enable the defenders to operate on the inside of an arc and reinforce any threatened point more speedily than could the attacking forces. In short, the formidable nature of the Carpathian barrier must inevitably impress itself upon every campaign in which it should become involved.

### *The Podolian Plateau*

**Terrain of the Podolian region**

The rocks, which are strongly folded in the Carpathians, suddenly flatten out toward the northeast and north to form the more level country of Galicia and Poland. The topography is not always that of perfectly horizontal rocks, however, but betrays the presence over broad areas of moderate dips toward the mountains. Thus in eastern Galicia there is an inclined plateau with its gentle back slope dipping southward obliquely toward the range, while on the north the steep erosion scarp faces northeast, north, and northwest toward a broad lowland eroded by the headwaters of the Bug and Styr Rivers. This highland is known as the Podolian Plateau, and has the same form and origin as the plateau belts of the Paris Basin. The rivers flowing southward down the gentle back slope have cut deep gorges, which are remarkable for their straightness and their parallel arrangement. To this system belong the Sereth, the Strypa, and the Zlota Lipa, formidable military obstacles which have figured largely in the Galician campaigns. Toward Przemysl

**River gorges**

the rocks of the Podolian Plateau appear to change to a southwestward dip, and the steep erosion escarpment bends abruptly toward the northwest. At the base of the escarpment, near the angle where the line of cliffs changes from a northeast-southwest to a southeast-northwest direction, lies the city of Lemberg, guarding a strategic gateway or low pass from the Bug lowland through the plateau to the San-Dniester lowland and Przemysl. Farther northwest, Rawaruska occupies a similar position. At both points strategic railways cross through the plateau from one lowland to the other.

**Strategic position of Lemberg**

**Terrain of southern Poland**

West of the San River the plateau topography is less pronounced, but the upland of southern Poland may represent its continuation, with a gentle slope toward the southeast and a poorly developed and very ragged escarpment facing northwest. If this is the case the upper Vistula would appear to flow along the depression formed by the intersection of the southeastward slope of the plateau and the northward slope of the Carpathian piedmont plain, just as the San and Dniester Rivers flow in opposite directions along the depression of similar origin farther east. The surface of the south Poland plateau is a forested upland, having an average elevation of nearly a thousand feet over broad areas, and dissected by deep stream gorges which make the country difficult to traverse. It is complicated by a broad uplift in the Kielce district which brings older rocks, containing valuable mineral deposits, to the surface and forms the heights of Lysa Gora rising far above the general level.

**The Cracow-Jaroslaw trench**

Between the western continuation of the Podolian Plateau and the northern base of the Carpathians is an east-west lowland of capital strategic value. In form it is a broad shallow trench, occupied by no single river, but rather by branches of several streams, including the headwater portion of the main Vistula River. At the east the lower Wislok

follows the trench for twenty-five miles before joining the San, while large branches of the Wisloka flow eastward and westward through it to join the trunk stream. Through it also passes the main railway line connecting Bukharest and the Black Sea with Berlin and western Europe. Protecting the eastern entrance to the trench, just where the railway enters it, stand the fortresses of Przemysl and Jaroslaw; at its western end is the great ring fortress of Cracow.

### *The Plain of Poland*

Terrain of the plain

North of the Podolian Plateau and its westward continuation in south Poland stretches the monotonously level plain of central and northern Poland. Here the strata of recent geological age lie horizontal, and the only topographic features of importance are the river valleys. As the plain surface is usually but 300 or 400 feet above the sea, the rivers cannot cut deep trenches; but they have widened their valley floors, and meander extensively over the broad flood-plains deposited during periods of high water. Floods result from heavy rains in the Carpathians or from ice dams along the lower courses of the streams. The principal river is the Vistula, which from the junction of the upper Vistula and San flows in a broad shallow trench northwesterly through the Polish plain into Prussia, where it turns sharply northward to the Baltic. A majestic river of great volume, unfordable and seldom crossed by bridges, subject to terrible floods which may cover its entire valley bottom, it forms one of the most serious military obstacles in Europe to an enemy which would cross it; but a magnificent waterway, navigable for large vessels from the San to its mouth, for armies which are able to use it as a line of communication. Warsaw is located on a terrace 120 feet above the level of the stream, and therefore safe from damage by the floods.

The Vistula trench

River and marsh barriers

Chief among the tributaries to the Vistula is the Bug, itself a stream of good size. Its upper course flows for miles through a swampy flood-plain, the main current seldom approaching close to the dry banks. As this part of its course runs from south to north, it opposes a difficult barrier to troops moving east or west. Where the river begins to turn westward is the Russian fortress of Brest Litowsk, surrounded by low marshy lands which can readily be flooded to prevent an enemy from approaching the fortress walls. The Narew River is likewise bordered by almost impassable marshes which continue northeastward past Augustów to connect with the Niemen trench, thereby completing a continuous topographic barrier extending from the lower Dniester gorge along the upper Dniester and San marshes, down the Vistula to Warsaw and up the Narew to the Niemen, thence down the Niemen to the sea. Every part of the barrier thus described has played an important rôle in the fighting in the east.

Brest Litowsk

Glacial topography

The greater part of the Polish plain has been glaciated, the ice sheet having reached nearly as far south as Lemberg. A mantle of glacial soil covers much of the area, and has greatly disturbed the preglacial drainage. In the obstructed valleys, lakes and swamps are common, and extensive areas of marsh characterize the undrained surface of the faintly undulating glacial deposit. Where the plain continues unchanged into Russia proper, we find the famous Pripet River swamp, a vast labyrinth of marsh, bog, and sluggish rivers.

When the edge of the great glacier lay on the Polish plain, rivers flowing toward it were blocked by the ice sheet and compelled to flow along its margin until the barrier melted away. The marshy channels of these temporary river courses form an interesting element in the plain topography. North of Lodz one of these channels continues the course of the Bzura River westward into the drainage of the Warta,

Abandoned river valleys

Paul Thompson

**Typical view of the Polish plain near Lodz. The motor car was destroyed by a bomb from an aeroplane.**

*Paul Thompson.*

**German soldiers advancing toward Warsaw across the level surface of the plain of Poland.**

and, as we shall see, played a significant rôle in the great battle for Lodz. At Bromberg on the Vistula another of the channels runs westward along what was the temporary glacial course of the lower Vistula River.

**Absence of materials for road construction**

Aside from the obstacles to movement over the plain formed by the river trenches and marshes, it is necessary to remember that rocks underlying the plain surface are of recent date and unconsolidated. Accordingly they furnish no materials suitable for road construction. In a region where extreme flatness preventing ready runoff of rain water, broad expanses of permament marsh interrupting traffic, and a clayey soil forming a tenacious mud when wet, create a pressing need of good roads, there exists no material from which such roads may be made. Moreover the population is scattered and poor, and tempted to rely on river transportation in summer and transport by sleds on the frozen rivers in winter, instead of improving the roads. Railroads are few and good wagon roads almost non-existent. Military operations on the plain of Poland must, therefore, encounter difficulties of considerable magnitude, especially in winter when the roads become mired with snow and mud. "In Poland," said Napoleon, "I have learned of a fifth element—mud."

### *The Hill and Lake Country of Prussia*

**Morainic terrain of East Prussia**

The great ice sheet halted long enough in what is now East Prussia to have accumulated along its fluctuating margin a "moraine" or ridge of glacial débris of impressive proportions. A score or so of miles in breadth, the morainic belt attains an altitude of 500 to 1,000 feet. It is noted for its intricate network of marshes and lakes, which culminate toward the east in the Mazurian Lakes district. The whole morainic country is an endless maze of irregular hills covered

with wild, uncultivated areas of barren sandy soil, alternating with swamps, lakes, and forests. From the vantage point of some higher hill one gains the impression of a gloomy waste of country, partially clothed with woodland areas of birch and pine, and dotted with thousands of ponds, marshy swales, and irregular lakes. Roads and railways must follow the intricate defiles or narrow land bridges between the bodies of water and swamp, and to any but those who know it best, the region is a wilderness of monotonously similar topographic forms. Lyck, Allenstein, Tannenberg, and Osterode lie within this belt. Farther west another moraine reaches the Baltic Sea at Danzig; but the Danzig belt has not figured in the war up to the present time.

**Difficulties of the East Prussian terrain**

To an invading army the morainic country of East Prussia would seem to oppose almost insuperable obstacles. The forces would of necessity divide into a number of columns, each threading its way painfully along the narrow isthmuses of dry land and between the rolling hills. Hostile forces would contest the passage of each defile, and from the forested hills hostile artillery would pour its fire on the advancing columns. Compelled to deploy on a battle line, the troops would find their way blocked by ponds and marshes. Some of the ponds have sandy bottoms and to ford them is easy; but the same troops attempting to cross a similar body of water might suddenly find themselves trapped in a bottom of clay. Many of the marshes are firm enough for the passage of men, but others are treacherous bogs. The lines of communication behind the advancing armies would be few and difficult, and the opportunity for a successful retreat in case a superior foe was encountered would be comparatively slight. A secure fastness for the defending troops, a formidable barrier for invading forces, the hill and lake country of East Prussia has contributed an interesting chapter to the war in the east.

### *The Russian Plan of Campaign*

The distance to Berlin

With the above-described types of topography in mind, let us consider briefly the general plan of the Russian campaign against the Teutonic allies. At the beginning of the war one was tempted to measure the distance from the western border of Poland to Berlin and consider this as the distance Russian armies had to move in order to threaten the German capital. This, however, was to ignore the absolute dependence of armies upon thoroughly safeguarded lines of communication. It would manifestly be impossible for a large Russian army to concentrate in western Poland and move on Berlin so long as an unbeaten German army occupied the morainic country of East Prussia, and a similar Austrian army existed in the rugged plateau upland of Galicia; for as soon as the advance on Berlin was started, the lines of communication running from Russia through Poland to the army at the front would be in peril from a southward advance of the Germans debouching from the morainic hills, or a northward advance of the Austrians descending from the Podolian Plateau. If either advance succeeded in severing, even for a short period, those arteries which alone enable an army in the field to live, disaster to the Russians would speedily follow. It would be more accurate, therefore, to draw a line from the eastern point of the Prussian border southeastward to the eastern border of Galicia, and consider this as the line from which the Russian advance on Berlin must be measured. This, roughly, doubles the length of the advance.

The East Prussian problem

Already in possession of the territory immediately in front of the center of this line, the Russians had to concern themselves with the hostile territory at the north and south. On the north the task was the more serious. Here were combined the most highly perfected military machine and the most

difficult topography. In order to make an advance on Berlin from western Poland feasible, Russian armies must drive the Germans out of all that part of Prussia projecting east of the west Poland border. This would involve not only the traversing of the morainic hill and lake country, but in addition the passing of a very serious obstacle, the broad, shallow trench of the lower Vistula which cuts across the neck of the peninsula of eastern Prussia. The strength of this defensive line lies in the fact that the invaders would have to cross the broad, flat floor of the valley under fire from artillery posted on the crest of the western valley wall, and would also have to negotiate an unfordable river of great breadth and volume; and in the further fact that each end of this line is guarded by a powerful fortress, Thorn at the south and Danzig at the north.

**The Galician problem**

In several respects the topography in the south favored the Russian plans. No topographic barrier along the boundaries between Russia and Galicia prevents an easy invasion of the latter, whereas the formidable barrier of the Carpathians does separate Galicia from the rest of Austria-Hungary. Galicia is, therefore, a peripheral province, which is for topographic reasons peculiarly isolated from the rest of its country and therefore more easily subject to conquest by a neighboring power. During the invasion the deep gorge of the lower Dniester, and farther west the marshy flood-plain of the upper Dniester, would serve as admirable protections for the left flank of the invading army. Once the Austrian armies were pushed westward toward Cracow or southward over the Carpathians, the few passes over the latter could be held by small detachments of troops, and the left flank of the westward-moving Russian army would then have the effective protection of a mountain barrier; for while several roads and railways cross through the passes, they are so readily controlled that the strategic importance of the

barrier is not greatly diminished. Austrian reinforcements would have to defile through the passes and along the few narrow mountain roads in greatly extended columns, a formation which would render them vulnerable to attack by inferior numbers. No sudden assault of serious magnitude upon an army flank which is protected by a mountain barrier is feasible so long as the defending troops properly perform their functions.

**Basis of the principal offensive**

With these favorable topographic elements was combined the further favorable fact that the Austrian armies were less formidable than the Prussian military machine. Political conditions in Austria-Hungary also dictated a vigorous Russian offensive in Galicia, since a nation composed of heterogeneous elements, some of them held in subjection against their will, can be more easily driven to seek peace after military reverses than can a nation which is better unified. Topographic, military, and political considerations combined, therefore, to induce the Russian General Staff to subordinate the East Prussian campaign to far greater movements in Galicia.

# CHAPTER VI

## EAST PRUSSIAN CAMPAIGNS

The Russian advance

INTO the morainic country of East Prussia the Russians launched a vigorous offensive in the first month of the war. Two main armies coöperated in the movement, one advancing from the fortified bases at Kovno and Grodno on the east, the other moving north from the forts along the Narew River. Advancing along occasional roads through the hills and forests in a few long-drawn-out columns the Russians invaded the home of the Teutons. Before the end of August they had threaded their way through the forests, among the lakes and marshes, and over the rolling hills, always beating back the German defensive, until more than half the distance to the Vistula barrier had been traversed, and a portion of the defeated German forces shut up in the fortress of Königsberg. Then two Russian army corps, caught in the mazes of the difficult region near Tannenberg by a successful German manœuver, were practically annihilated. Von Hindenburg, intimately acquainted with every mile of the morainic land from long study on the ground, so disposed his forces as to cut off every practicable avenue of escape for the Russians except a narrow defile between some of the lakes. Furiously attacked and pressed back upon this defile in confusion, the Russians became hopelessly congested at the one exit from the trap. Eighty thousand men were captured or destroyed. The difficulties of negotiating the morainic defensive line in the face of the Prussian military machine had proved too great, and the Russian line fell back.

German victory of Tannenberg

The morainic topography continues across the East Prus-

sian border into Russia, where, in the region of Suwalki, one finds a country of forested, marshy fenland and lakes, perhaps even more difficult to cross than the region farther west, especially since roads and railways are less numerous. From Suwalki eastward to Sejny a narrow causeway through the marshy forest is the main highway of travel. As the Russians fell back the Germans followed them into this difficult region. It is interesting to note that the Germans were now confronted with almost exactly the same topographic features which had opposed the westward movement of the Russians. Not only was there a region of hills, forests, lakes, and swamps to be crossed, but beyond lay the valley of a large river, the Niemen, which, like the Vistula, runs from south to north across the path of advance. To correspond with the fortresses of Thorn and Danzig at the two ends of the Vistula barrier stand the fortresses of Grodno and Kovno at the ends of the Niemen trench.

**Terrain of the Suwalki region**

**The Niemen trench**

This great topographic barrier was Russia's main protection against an invasion from Prussia. Behind it, and its continuation in the Bobr and Narew River marshes, the retreating Russian armies took their stand about September 25th. Against this line the German armies dashed themselves in a vain endeavor to pass over to the eastern side. After a vigorous artillery duel the German offensive waned, the Russians retook the offensive, and there began that pursuit of the German columns back through the marshes and forests to the westward which is known as the Battle of Augustów. Hampered by the broad marshes and few roads, the Germans lost heavily, particularly, it is reported, along the narrow Suwalki causeway. By the first week of October the German line had been pushed back into Prussian territory at the south and nearly to the Prussian border on the north. The topographic barriers of the Suwalki province had in turn proved too difficult for the German armies. By

**Battle of Augustów**

a slow and painful advance the Russians were able to reach the line of the Angerapp River and eastern side of the larger Mazurian Lakes by November 15th, which excellent defensive line they held for three months, until the sudden arrival of new German forces in February compelled another Russian retreat to the defensive line of the Niemen, Bobr, and Narew.

**Angerapp River-Mazurian Lakes barrier**

**Object of attack on the Niemen-Narew barrier**

To appreciate the probable significance of this new German advance, and thus to judge of the extent of its success, we must review certain features of the local geography. The possession of Warsaw had long been coveted by the German General Staff, both because of its strategic importance as a railway center and as a point for crossing the Vistula, and because of the political importance of the Polish capital. To achieve the capture of the city Von Hindenburg had already sacrificed tens of thousands of lives in repeated and spectacular direct assaults from the west. An alternative plan of indirectly reducing the city by severing its communication with the main part of Russia may well have appealed to him in view of the failure of direct attacks. The most direct railway line between Warsaw and Petrograd passes within forty-five miles of the East Prussian border, and to sever this important line of communications would be a long step toward the reduction of Warsaw.

**Natural defenses of the Warsaw-Petrograd railroad**

Between the German armies in East Prussia and the coveted railway there was first the fortified line of the Russians along the Angerapp River-Mazurian Lakes barrier; but farther back and far more important was the great natural barrier formed by the Niemen, Bobr, and Narew Rivers with their associated marshes. The north-south trench of the Niemen, protected by the fortresses of Kovno and Grodno at the north and south respectively, has already been described. Near Kovno the river is perhaps a quarter of a mile broad, and everywhere throughout this portion of its

The Niemen River spanned by a German pontoon bridge.

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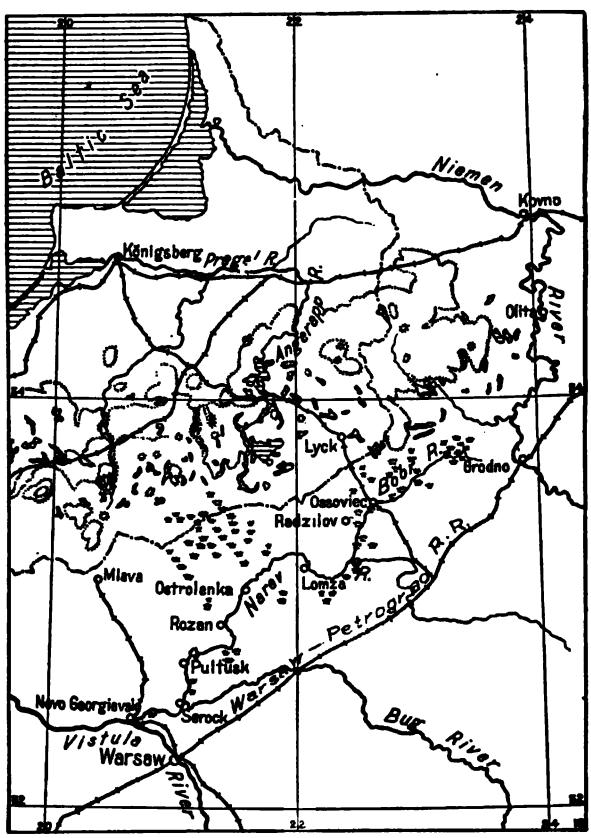
Russian troops intrenched on the east bank of the Niemen, firing on German forces attempting to cross the river.

course is a formidable obstacle. From a short distance west of Grodno the river Bobr flows in a southwesterly direction, continuing the defensive line until it joins the Narew, after




Figue 7. Natural defenses of the Warsaw-Petrograd railway.

which the barrier consists of the Narew as far as its junction with the Bug, and of the Bug for the short remaining distance to the Vistula. The Bobr, in spite of its small size, is a very difficult obstacle to cross. Broad marshes flank it

on either side, the belt of wet country sometimes reaching a breadth of many miles. The Narew is a meandering river of larger volume, bordered by numerous abandoned meander channels or oxbow lakes, and likewise flanked on either side by broad areas of marsh.

**Fortifications of the Niemen-Narew barrier**

In order to render this natural obstacle still more formidable, the Russians had erected imposing fortifications at various points along the line. The most important were Kovno at the northern extremity; Grodno at the south end of the Niemen trench, and near the short gap in the barrier which intervenes between the Niemen and the Bobr; Ossowiec on that portion of the Bobr most easily reached from Prussian territory; and Novo Georgievsk at the southwestern extremity of the line. Olita, Lomza, Ostrolenka, Rozan, Pultusk and Serock were smaller forts erected at intervening points along the river. When one remembers that in addition to the forts, temporary field fortifications and trenches built after the war began had still further strengthened a line already made exceptionally strong by Nature, one can understand why two great German offensive movements broke down when this line was reached.

**The second German offensive**

In his second offensive Von Hindenburg seems to have avoided, so far as possible, the morainic belt of hills and lakes, and to have advanced across the more level country to the north and south with a rapidity which would have been impossible in the region of the hills. It was indeed in the morainic region around Lyck that the Russians longest kept a foothold on German soil. It is also noteworthy that some of the largest captures of Russian prisoners made by the Germans in this second advance occurred in the marshy forest at the eastern end of the morainic belt where lake and swamp render retreat more difficult.

Ossowiec is the point on the river-marsh barrier most easily reached by the Germans, and was besieged both during

the earlier and later German attacks on this line. The only railway between the western extremity of the Niemen-Bobr-Narew line and Grodno runs from Lyck in East Prussia to Ossowiec, and continues southward to the Warsaw-Petrograd railway. This line enabled the Germans to bring their heavy siege artillery right up to the barrier they wished to break through and to supply the forces attacking the Ossowiec forts. If successful here, they could continue along the railway to break the Warsaw-Petrograd line of communication. Fortunately for the Russians, the natural barrier was especially strong in the vicinity of Ossowiec. Broad marshes on either side made it difficult for an enemy completely to invest the fortress. The moving and placing of guns is difficult in marshy land and it is reported that after some of the guns were brought up within range of the forts, they had to be taken farther back to find satisfactory positions on dry ground, especially as a thaw had rendered the marshes more dangerous. Intrenching in a marsh is almost impossible; and heavy siege guns in marshy land are liable to capture by sorties from the fortress if unprotected by well-intrenched infantry. According to report some of the guns intended to reduce the fortress were taken west to the dry ground around Radzilow for safety, while others were caught in the marsh by the thaw and could not be removed. For a second time the topographic difficulties of the Ossowiec district contributed largely toward rendering the German siege a failure.

**Marshy terrain and the sieges of Ossowiec**

It would seem that the Germans succeeded in really breaking the Niemen-Bobr-Narew barrier at but one point. This was just north of Grodno, where German troops crossed to the east bank of the Niemen in considerable numbers. The eastern extension of the Augustów forest, reaching to the river at this point, afforded sufficient protection to the Germans to enable them to force a crossing along

**German failure to pass the Niemen-Narew barrier**

a front some twelve or fifteen miles in length. It should be noted that here the Warsaw-Petrograd railroad lies very close to the river-marsh barrier. The breach was too narrow, however, to permit any extended eastward advance; and failing to widen it, the Germans were forced to retreat. Russian armies, which had taken up defensive positions behind the barrier, gradually resumed the offensive, and pushed the Germans back toward the Prussian border all along the line. The German offensive had failed to pierce the railway line behind the fortified natural barrier, and Warsaw was safe for the time. Russian armies had suffered great losses during a retreat made more difficult by bad weather conditions; but the German losses were likewise very high, and while East Prussia was freed from the invader, the strategic position of the German armies was probably not improved by the advance beyond their own strong defensive position on the west side of the river and lake barrier in East Prussia.

## CHAPTER VII

## EARLY GALICIAN CAMPAIGNS

The Austrian offensive

In the Galician field of operations the initiative was first taken by the Austrians, who launched an offensive northward into that part of Poland east of the Vistula in the early days of the war. With its left flank protected by the barrier of the Vistula and its right in touch with the marshes of the Bug, the Austrian advance on Lublin and Cholm began. Apparently the Russians decided to swing back toward the east and, if necessary, put the barrier of the Bug between themselves and their enemies until the main Russian armies farther south should have delivered their blow; for we find the northern armies gradually retreating on a front becoming more and more nearly parallel to the river. The Austrian advance was short-lived, however, for about the middle of August Generals Russky and Brussilov, with enormous Russian forces, began their smashing advance into Galicia from the east, thus threatening the rear of the Austrian armies facing north or northeast in Poland. The marshy flood-plains of the Bug River, together with the meandering course and interlacing channels of the stream, afforded a good first line of defense for the Austrians, from behind which they might hope to check the Russian advance. The marshes were probably more formidable to the invader than was the channel of the river itself; for in negotiating them troops had to " defile " along the few good roads crossing the wet lands in long, narrow columns which offered a good mark to the defenders. It was not surprising, in view of the

The Russian offensive

Bug River barrier

topography, to hear of fierce fighting along the line of the Bug River and to read in the despatches repeated references to the few towns, such as Sokal and Kamionka, marking the points where important roads cross the wet valley floor. The Austrians now realized, however, that if the advantages of topography were with them, the advantages of numbers were overwhelmingly with the Russians. The passages of the Bug were forced by weight of superior forces, and the defenders began what was to be a long and disastrous retreat.

**Attack on the Podolian escarpment**

After defeating the Austrians along the Bug, the Russians in their westward advance soon reached the barrier presented by the steep face of the Podolian Plateau scarp where it trends from southeast to northwest. The situation was much like that encountered by the Crown Prince's army in France when it attacked the steep east-facing escarpment near Verdun. In places the Podolian scarp rises five or six hundred feet above the Bug lowland, and is often quite precipitous, especially where resistant limestones composed of old coral reefs weather into nearly vertical cliffs. In other places the escarpment is lower, but steep, and may present a nearly continuous wall for many miles at a stretch. Occasionally it slopes down more gradually to the plain as a forested hillside, while out in front are numerous erosion remnants in the form of mesas and buttes. Whatever the local nature of the escarpment, it offers a serious obstacle to the troops which must cross the lowland toward it under fire of artillery posted on the crest, and then ascend the steep slope in face of the enemy's fire.

**Battles for the gateways**

The two great battles of Lemberg and Rawaruska were waged for possession of the two strategic gateways through the Podolian Plateau belt. A part of the fighting for Lemberg took place east of that city, on the long foothill ridges which here extend many miles out into the lowland. The main "battle of Lemberg," however, was fought farther

south, on the plateau upland. As will be seen from the diagram, opposite page 50, the direction of the steep escarpment is such that it can be avoided by an army crossing the upland surface south of the latitude of the city, although this army would encounter the successive deep gorges of the parallel streams flowing down the back slope of the plateau to the Dniester. It was Brussilov's army which swept the Austrians from this region, although not without bitter struggles at the principal crossings of the larger river trenches. In the final struggle south of Lemberg, as along the escarpment farther north to Rawaruska and beyond, the Russians were victorious. That the Austrians did not hold this line longer was probably due in part to the fact that they had expected to fight the decisive battle farther north in Poland and had not kept sufficient troops in the southern district to cope with the unexpectedly large Russian army sent against them there; and probably also in considerable part to disorganization resulting from their defeat along the Bug River.

**Lemberg and Rawaruska**

Immediately west of Lemberg lies the fortified town of Grodek, standing in one of the north-south parallel valleys, here occupied by a string of lakes connected with each other by rivers. Along this barrier the Austrians fought a rear-guard action to cover their retreat, and succeeded in checking the Russian advance for a short time. The next important physical barrier west of the Lemberg district is the marshy lowland of the San and upper Dniester valleys. As already noted, this is a lowland formed by the intersection of the back slope of the Podolian Plateau and the piedmont slope in front of the Carpathian barrier. The northwest flowing San and southeast flowing Dniester make an almost continuous river barrier along the lowest line of the lowland. Both rivers meander extensively on broad, marshy flood-plains in which are countless abandoned meander channels and oxbow lakes. Along the San, which varies in width from 50 to

**Rear-guard action along the Grodek barrier**

**The San and Dniester marshes**

150 yards, the meanders are larger than those of the Dniester, and the oxbow lakes and crescent-shaped marshes are both larger and more numerous. Indeed, the lower San is characterized by a perfect network of these cutoff lakes and marshes, making passage across the flood-plain unusually difficult.

**Austrian losses in the marshes**

An obstacle like the marshy belt of the San-Dniester lowland, while a valuable line of defense for an army retreating in good order, becomes a serious menace to an army which has been badly beaten and is retreating in confusion before an energetic pursuer. Fleeing troops crowd in disorder toward the few passable roads leading over the marshy ground, and lose most of their fighting power as a consequence of the ensuing disorganization. After the Battle of Lemberg the despatches repeatedly referred to the efforts of the Russians to drive the broken and defeated Austrian armies into the marshes to the west, where they could be overwhelmed with disaster. That these efforts were partially successful is indicated by the inability of the Austrians to hold the Russians in check along the San-Dniester line, and the evidently decreased fighting power of the Austrians during the immediately succeeding weeks. Przemysl, the great fortress which stands near the gap between the marshes of the San and those of the Dniester, was soon invested, and the Russians pressed on to seize the passes across the Carpathians southwest of the fortress, thus securing their left flank from danger of sudden attack in the future.

**Przemysl**

**Strategic value of the San-Dniester lowland**

The conquest of the San-Dniester lowland by the Russians was of geographical interest from two other standpoints. Although a barrier to an invader who would cross it, the lowland is one of the great routes of travel between central and southeastern Europe. The Carpathians on the southwest, and the vast marshes of the Pripet River across the Russian border to the northeast, restrict travel to the San-

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**Fortification at Rozan. In the distance is the flat, marshy floor of the Narew valley.**

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**The San River spanned by a temporary bridge constructed by Russian army engineers.**

Dniester depression. Along its axis runs the main railroad connecting Bukharest and the Black Sea, via Czernowitz and Cracow, with Berlin and western Europe. The control of a natural highway continuing northwestward down the Oder to Berlin, was of no small value to armies which had Berlin as their ultimate objective. Of more immediate importance was the capture by the Russians of the oil fields on the southwest side of the lowland, especially near Drohobycz. From these fields came an appreciable part of the fuel used by the motor transport service of the German armies, and the loss of this source of supply must have been a serious blow to the Teutonic allies.

**Drohobycz oil fields**

After passing the line of the San and Dniester, the Russians continued their westward advance toward Cracow. The topographic line of least resistance is here the subordinate lowland lying along the south side of the broader lowland earlier described, and just at the base of the Carpathian foothills. The main railroad already mentioned takes advantage of it in passing from Przemysl to Cracow. The capture of Jaroslaw about the end of the third week in September gave the Russians full command of the entrance to this subordinate lowland or trench. About September 23rd they reached the strategic point Rzeszow, where the Wislok debouches into the trench; and a few days later Debica, where the Wisloka similarly flows from its mountain valley out upon the trench floor. By the end of the first week in October the invaders were in the vicinity of Tarnow, still farther west where the Biala River enters the trench to unite with the larger Dunajec. Thus the strategic points of which we heard most frequently mark the junction of transverse mountain valleys with the subordinate lowland parallel to the mountain base. During this advance troops were also moving westward through the mountains just to the south. Here they encountered the obstacles formed by the fairly

**Russian advance through the Cracow-Jaroslaw lowland**

**Tarnow**

**Rivers and basins of the Carpathians**

open flat-floored valleys of the rivers mentioned above. Along all of these valleys, which lie across the line of advance, the Austrians offered resistance to the invader's progress. Occasionally the valleys expand into fairly broad intermont basins on whose level floors stand towns of more than ordinary size and military importance. Among those most frequently mentioned in the war despatches were Krosno in a basin on the Wislok; Gorlice, Zmigrod, and Jaslo, occupying the three corners of a triangular basin on the Wisloka; and New Sandek and Zakliczyn in separate basins on the Dunajec.

**Russian retreat to the San River barrier**

The subsequent retreat of the Russians from in front of Tarnow was not connected with any topographic obstacle in Galicia, nor indeed with any Austrian victory in this region. A German advance on Warsaw across the plain of Poland early in October made it necessary for the Russians to fall back at the south in order to keep their left wing in line with the retreating center. The retreat stopped at the admirable defensive line formed by the San River and its marshy flood-plain. Behind this barrier the Russians took up their position about October 11th; and whereas the broken Austrian armies retreating from the Lemberg region earlier in the campaign had been unable to profit by the natural defensive line of the San, the Russians now held it successfully against the Austrian attacks. A few Austrian troops succeeded in crossing the river at isolated points; but they were never able to effect a crossing in force, and the Russians maintained their position until the defeat of the Germans before Warsaw and their consequent retreat enabled the Russians to resume their westward advance in Galicia. During this second advance the subsidiary lowland from Jaroslaw to Cracow again exercised a controlling influence on the movements of the armies, while the transverse north-south valleys in the Carpathians provided a succession of

**Failure of the Austrians to pass the barrier**

**Russian advance on Cracow**

defensive lines along which fierce battles were waged for a second time.

Russian retreat to the Dunajec barrier

When the Germans began their second drive at Warsaw about the middle of November, the Russians had reached the environs of Cracow at the western end of the Galician lowland. As the Germans pushed eastward to the line of the Bzura, Rawka, and Nida Rivers, the Russians in Galicia were again compelled to retreat. This time, however, they fell back a comparatively short distance, and took up a defensive position on the east bank of the lower Dunajec River soon after the middle of December. Aided by the natural protection which the river and its broad, flat valley afforded, the Russians held this line for many months, notwithstanding vigorous efforts of Austro-German armies to dislodge them.

German plan for an offensive in Bukowina

Farther southeast the Russians had forced the gateways of the outer wall of the Carpathians, inadequately defended by the demoralized Austrian armies, and were knocking at the main passes on the crest of the range. Germany now came to the aid of her hard-pressed ally, and planned a joint operation against this wing of the Russian line designed to avert the peril threatening the Hungarian plain, to impress wavering Rumania with German military prowess, and to relieve the Austrian army besieged in the fortress of Przemysl.

Terrain of Bukowina

We have already seen that parallel to the Carpathian crest, and lying in the trough formed by the Carpathian piedmont and the back slope of the Podolian Plateau, is the deep-cut gorge of the lower Dniester. Parallel to the gorge and nearer the mountains is the broad lowland of the Pruth River, with Kolomea near its western and Czernowitz near its eastern end. Northwest of Kolomea transverse rivers flow from the crest of the mountains out to the Dniester, whose upper course lies on a broad, marshy valley floor. If superior

Austro-German forces could drive the Russians from the eastern Carpathian passes back through Bukowina and across the gorge of the Dniester, a much smaller force could hold them at bay along this natural barrier while the bulk of the Teutonic armies turned northwestward to cut the lines of communications behind the Russians still remaining in the mountains farther west, compelling them in turn to fall back behind the marshy barrier of the upper Dniester to avoid disaster. Could this process be carried far enough, the oil fields of the Drohobycz region would be recovered, and the siege of Przemysl raised. The transverse valleys from the mountain crest to the Dniester would, of course, be seized upon by the Russians as defensive lines to prevent the flanking of their armies still in the passes; on the other hand, they would serve to protect the Austro-German armies in case their attack failed and the Russians assumed the offensive.

**Limited success of the German offensive**

What actually happened was this: The Russians were forced back to the north side of the Pruth lowland before they were able to make a successful stand against the heavily reinforced armies of their enemy. In places they even appear to have retired their main line to the northeast bank of the Dniester. On the other hand, it seems that the Austro-Germans failed to drive the Russian left wing as a whole back of this barrier. Russian forces deployed along the minor barriers formed by the transverse valleys connected the retired Russian left wing with the advanced position of the main army on the crest of the Carpathians, and prevented a Teutonic advance from the southeast toward Drohobycz and Przemysl. Bukowina was practically cleared of Russian forces and the menace of Rumanian intervention removed for the time being; but the Russian armies were not forced behind a natural barrier where they could be held in check by inferior forces, and the hoped-for relief of Przemysl from the southeast failed.

Battles for the Carpathian passes

Meanwhile events were occurring along the Carpathian crest which demand our consideration. When the Russians made their first advance on Cracow, the Carpathian Mountains, with their parallel sandstone ridges guarding the northeastern approaches to the irregular central crest of the main range, afforded an effective protection against a flank attack by the Austrians. No serious attempt was made by the Russians to pour large bodies of troops through the passes to overrun the plain of Hungary. They were content to threaten the plains by raiding parties, or to hold the narrow passes against Austrian attacks. Now, however, the conditions were reversed. It was the Austro-German armies which were fighting a defensive warfare and attempting to hold the passes in the face of large Russian forces engaged in a serious campaign to break through the mountain barrier and invade the Hungarian plain.

Defensive value of the terrain of the passes

In both cases the mountainous topography was a powerful ally of the force on the defensive. At no time during the earlier operations were the Austrians able to get through the passes in sufficient numbers seriously to threaten the Russian flank. Small bodies of Russians, aided by the difficult nature of the terrain, were able to prevent an Austrian advance into central Galicia. Later the Russians found it equally difficult to advance their own armies across the barrier into Hungary. Some conception of the enormous influence of topography upon army movements in this district may be gathered from the fact that although the Russians were painfully making some headway through the mountain ranges prior to the fall of Przemysl, the large reinforcements thrown into their battle line after that event were not sufficient to render possible any great advance.

Difficulties of the terrain

It is not difficult to understand why the Carpathians present so serious an obstacle to a military offensive. The parallel northwest-southeast trending ridges which consti-

tute the northeastern zone of the middle Carpathians are natural walls of formidable proportions. To cross the intervening valleys and scale such walls in the face of hostile fire involves an attack in numbers greatly superior to that of the defenders, and will usually require the sacrifice of many more men than the defending force will lose. After the Russians had carried several of the ridges, they were held in check for a long time on the Polonina ridge southeast of Cisna, unable to cross the broad valley to the south and capture the main crest of the range between Lupkow and Uzsok passes. Scarcely less difficult for a hostile army is the task of forcing the narrow water gaps, those natural gateways which transverse streams have cut through the parallel ridges. Railroads and good wagon roads are limited in number, and must pass through the water gaps as they converge toward the still smaller number of mountain passes across the main crest. Advancing armies must frequently defile through the gaps, and move in long, slender columns over a single road, exposed for miles to the danger of attack under conditions which would make effective resistance very difficult. The approach to the main passes is thus beset with most serious difficulties for the army which assumes the offensive; and an advance through the passes themselves is impossible until the defending forces have been driven from the adjacent peaks and ridges on either side.

**Factors affecting the defense of a pass**

The ease with which a mountain pass may be defended depends on a number of factors, among which we may mention the steepness of the ascent to the pass, the height of the pass above the adjacent country, its breadth and the breadth of the valley or valleys leading up to it, its length from one side of the range to the other, whether or not it is dominated by neighboring peaks and ridges affording easily defended artillery positions, whether or not neighboring roads and subsidiary passes permit parallel columns to coöperate in

*Central News.*

**When mountaineering and warfare are one. Austrian troops scaling a precipitous slope.**

the attack on the main pass and possibly to turn the position of its defenders by getting in their rear, whether the mountains are forested or open, and the extent to which railroads crossing the passes are built over bridges and through tunnels.

Dukla pass

The Dukla pass is not high above the adjacent country; it is comparatively broad, and the distance between the small towns at either end is not great; a good straight road runs through it on easy grades, but no railroad takes advantage of it. Presumably it was the most easily captured of any of the main passes, and, together with two minor passes on either side, was taken by the Russian troops early in the campaign.

Lupkow pass

Twenty miles or more southeast of the Dukla is Lupkow pass. This is really a double pass, higher than the Dukla and somewhat longer. A railroad connecting Hungary with the fortress of Przemysl crosses the pass by making a big S-shaped double loop, passing through two short tunnels and following high along the side of one mountain ridge for several miles. A good wagon road crosses the main crest by a minor pass three or four miles to the northwest, but must make numerous zig-zags on account of the steepness of the slopes on either side. The country is open or rather thinly forested, and no commanding eminences dominate the pass. It would seem, therefore, that the Lupkow pass, while much more difficult than the Dukla and probably enough higher to have the snow melt out later in the spring, should not present insuperable obstacles to a vigorous offensive. Damage to two short tunnels could be repaired, and the absence of long bridges would make it difficult for the Austrians to render the railroad useless for any great length of time. After securing the Dukla the Russians naturally turned their principal attention to the Lupkow pass. Whether or not they secured complete control here is not

clear, although they certainly reached a more southerly point a short distance farther west.

**Uzsok pass**

Forty-five miles farther southeast is the Uzsok pass. Higher even than the Lupkow and with steeper approaches, it opposed such obstacles to the engineer that only recently was a railroad built across it. Part of the elevation is avoided by a mile-long tunnel at the summit, which if destroyed by the Austrians would render the road useless to the Russians for some time. Moreover, numerous bridges or embankments must be used to span the deep ravines crossed by the railroad, thereby affording additional opportunity for a retreating army to render the line unfit for use. The country about the Uzsok pass is more densely forested than that farther northwest, and snow lies longer in this pass than in those of lower altitude already discussed. A further obstacle to an attack on the Uzsok lies in the fact that the nature of the northeastern approaches compels a hostile army to defile for several miles along a single road commanded by positions from which the defenders could pour a devastating fire upon advancing columns. We can readily understand, therefore, why the Uzsok pass so long resisted repeated attempts of the Russians to capture it. Russian successes at the three main passes over the Carpathians seem to have been inversely proportional to the topographic difficulties encountered.

**Dangers of retreat in mountainous terrain**

The mountainous topography, so difficult to overcome during an advance, becomes a serious menace to a retreating army. Lines of communication are few in number, and the seizure of one of these by an enemy may compel the retreat of a long section of the battle front. During the retreat large numbers of troops, supply trains, and artillery are suddenly crowded upon the few roads leading back through the narrow valleys and mountain gateways. Confusion is almost inevitable, and if the enemy captures heights dominating the

roads, confusion may easily end in disaster. This danger is so real that even a serious threat against one of its lines of communication may cause an army to withdraw its front to a more secure position.

Rôle of the Dunajec-Biala trench

The temptation to strike at the Russian lines of communication east of Cracow, where they branched off from the Cracow-Jaroslaw lowland and followed the transverse valleys to their heads near the crest of the main range, was especially great because the battle line made an abrupt bend not far west of the Dukla pass, running northward a short distance west of and parallel to the communication lines. To defend these lines the Russians took up their main position on the eastern side of the Dunajec-Biala River trench, utilizing the valley itself as a natural moat in front of the artificial trenches. Evidently the Russians counted confidently on their ability to hold this natural barrier against all assaults, else the difficult passes of the mountains would never have been crossed by Russian troops which were absolutely dependent upon lines of communication passing through difficult mountainous country only a short distance east of the Dunajec-Biala line. An assault on this dangerous part of the Russian line was delivered at the end of April, 1915, with what profound consequences we shall have occasion to note in a subsequent chapter.

# CHAPTER VIII

## CAMPAIGNS IN WESTERN POLAND

Terrain of the Poland plain

We have seen that the Russian plan of campaign contemplated two principal offensives in East Prussia and Galicia, and the influence of topography upon military operations in these two regions has been emphasized in preceding chapters. The plain of Poland, at first of minor importance in the strategy of the war, was gradually becoming the scene of major operations. There accordingly remains to be considered the influence of surface features upon the campaigns in this theater of war. Let us remember, in the first place, that the difficulty of transporting and supplying armies, which is such a marked characteristic of the campaigns in Poland, is itself in part a response to the physical conditions of the region. The long roads necessitated by the vast distances, while favored by the levelness of the surface, are of very inferior quality because, as we have seen in a previous chapter, the rocks underlying the plain do not supply a large amount of good road metal, and because the numerous marshes which the roads must traverse afforded exceedingly poor situations for road building. The construction of both roads and railways is said to be discouraged by the excellence of the river transportation routes, which are navigable for large boats in summer and are available for sledge traffic when frozen over in winter. Cross-country movements are limited, therefore, to a few long railroad lines and a comparatively small number of roads which become almost impassable in bad weather.

As we should expect in so level a country, rivers and

Paul Thompson.

Broad expanse of the Polish plain as seen in wet weather. The troops are part of a German cyclist division.

marshes are the topographic features which have exercised the most evident effect upon the battle plans of the contending forces. During the first two months of the war the necessity of pushing the campaigns in East Prussia and Galicia, for reasons already indicated, led the Russians to pay little attention to operations in Poland. Raiding armies advanced and retreated along the few railroads for distances of a hundred miles without attracting serious attention, in view of the more important operations to the north and south. One striking exception to this statement is the important Austrian invasion of the Lublin district at the beginning of the war, during which advance and the subsequent retreat the barrier of the Vistula between Ivangorod and the Galician border was utilized as a protection for the Austrian left flank.

**Major rôle of rivers and marshes**

From the beginning of October, when the Germans commenced their first drive at Warsaw, the influence of river valleys upon the distribution and movements of the troops becomes very noticeable. Threatened by the German advance, the Russians fell back to the best defensive line in all Poland, the valley of the Vistula. Once behind this barrier they could receive the shock of the German onslaught with greater confidence in the outcome, and could hold the enemy at bay until a proper concentration of forces would enable them to take the offensive. The Vistula in this part of its course is crossed by bridges at but two points, Warsaw and Ivangorod. Near the Galician border it has a breadth of nearly a quarter of a mile, and at Warsaw of fully one-third of a mile. It is everywhere too deep to ford. Along its valley bottom are extensive belts of marsh, while from the crest of the plain above artillery could effectively shell troops endeavoring to cross the river and marshes.

**The great trench of the Vistula**

It was behind such a barrier as this that the Russians took up their position about October 10. Only at Warsaw

did they remain in force on the west bank, supported by the ring of fortresses which surround the Polish capital. From the Galician border the barrier is continued in the same straight line, as far as Przemysl, by the San River; and we have already seen that the Russians in Galicia fell back to this line in order to keep in touch with the armies farther north. For 250 miles or more an almost unbroken line of Russian troops from near Warsaw to Przemysl waited behind a great river barrier to receive the attack of the Austro-German forces. Never before in history had so simple a topographic element been used for strategic purposes on so great a scale. Against this barrier some two million men hurled themselves in a determined effort to force a passage. Aside from the attempt to capture Warsaw, their greatest efforts appear to have been concentrated upon that part of the line near Józefów, where the Vistula is narrower than elsewhere, and the chances of effecting a crossing better. But all attempts to pierce the Russian line ended in failure, and the Russians launched a vigorous counter attack on the German left which soon bent that wing backward away from Warsaw until part of it was facing northward along the line of the Pilica River. In assuming the offensive the Russians had to leave their secure positions on the eastern bank and cross the river under German fire, some of the troops near Ivangorod advancing through flooded swamps almost breast deep and crossing the stream in skiffs and ferryboats before pontoon bridges could be constructed.

**German assault on the Vistula-San barrier**

**Germans retreat beyond the Warta**

The continuation of this offensive compelled the Austro-German forces to retreat along the entire line. It was generally anticipated that the retreating armies would make their first stand at the Warta River, and attempt to utilize that topographic feature as effectively as the Russians had utilized the Vistula-San valley, especially since it was reported that active work in fortifying this line had been going on for

some weeks. But whether because the pursuit by the Russians was pushed too vigorously, or because the Teutonic allies preferred a line nearer their strategic railways just inside the Posen border, the Warta valley was crossed before the Russian pursuit was brought to a standstill, about the middle of November.

**Second German drive at Warsaw**

Immediately, there began the second German drive at Warsaw. During the German advance and Russian retreat a portion of the Warta valley was held for a time by the Russians to cover the retirement of their main force; but a more striking influence of topography on army movements may be seen by examining the battle line of November 17-19. At this time the line of contact between the two armies, after running northward through western Poland to Leczyca, turned due east toward Warsaw for thirty miles to Lowicz, whence it bent toward the north once more. The reason for this peculiar alignment is not far to seek. The Bzura River flows eastward from Leczyca to Lowicz in a shallow trench cut in the plain, and then turns gradually northward to the Vistula. Westward from Leczyca the trench continues, but is there occupied by a westward flowing branch of the Warta. It will be remembered from a previous chapter that this trench represents one of the temporary valleys of rivers displaced by ice barriers during the glacial period. For a distance of sixty miles the floor of the trench is practically one continuous belt of marsh, with one important causeway crossing it near Piontek, half-way between Leczyca and Lowicz; and another at Leczyca.

**Marshy trench protecting Lodz**

**Battle of Lodz**

Confronted by superior German forces advancing eastward from the Posen border, the Russians decided to fall back toward the south and take up a defensive position on the southern side of the marsh belt until reinforcements could arrive. In this position they could also protect the city of Lodz, which lay a few miles farther south. For a short time

they did succeed in holding the marshy barrier against the attacks of the enemy; but apparently the western part of the German line, already south of the marsh, forced the evacuation of Leczyca, while determined frontal attacks enabled the Germans to cross the causeway at Piontek. There followed that most remarkable confusion of the two lines, when the Germans who had broken through at Piontek nearly surrounded a portion of the Russian army at Lodz, and were in turn themselves surrounded by the Russians. When the lines were finally straightened out the Russians were gradually forced back until they took up a new defensive line running from north to south along the eastern banks of the lower Bzura, the Rawka, the Nida, and the lower Dunajec Rivers. Thus by the end of the third week in December the Russians were again lined up along a north-south barrier consisting of parts of several different rivers. This defensive line they held for a number of months.

**River barriers**

**Rôle of the lower Vistula River**

During the second German advance toward Warsaw, which was stopped by the Russian defensive along the line just indicated, the Germans made excellent use of the lower Vistula, from the mouth of the Bzura to Thorn, as a protection for their left flank. Ever since the middle of December the Germans south of the lower Vistula had been far to the eastward of Russian troops posted on the northern bank. At times large Russian forces advanced along the north bank well toward Thorn, and more than fifty miles west of the German front along the Bzura. This was possible because the great river, here bridged only at Plock and Wloclawek, prevented the Russians from crossing to the south side and attacking the German flank. Small German forces at critical points on the south bank of such a barrier could insure the safety of lines of communication supplying armies along the Bzura front. On the other hand, the Germans were largely denied the use of the Vistula itself as a

line of communication, as attempts to bring supplies by boat from Thorn were repeatedly thwarted by the activity of the Russian artillery posted on the northern bank of the river. In this connection it may be remembered that the Germans in East Prussia often operated far in advance of the rest of their line in Poland, because the east-west belt of difficult morainic country served as a protection against sudden flank attacks from the south.

Strategic rôle of rivers and marshes

The important strategic rôle played by the rivers and marshes of the Polish plain will be traced further in a later chapter. Enough has already been shown to justify the conclusion that these two elements of Polish topography were much utilized by both combatants. After the failure of the dash to Paris the Germans probably hoped to take possession of the line of the Niemen-Narew-Vistula-San before the beginning of winter. They could then intrench themselves along this continuous marsh and river barrier, holding the Russians at bay with as small a force as practicable and freeing the largest possible number of troops for a renewed offensive in the west. Such a line could have been readily defended because of its physical character, and would have had the added advantage of lying mainly on Russian soil and including within its limits the captured Polish capital. The project failed because the Russians themselves made effective use of the same line of barriers in their operations against the Germans, and were ultimately able to take and hold positions along another line farther west.

# CHAPTER IX

## TEUTONIC PLAN OF CAMPAIGN IN 1915

In preceding chapters we have traced the principal eastern campaigns of the first fall and winter of the war. There were now in preparation by the German General Staff plans for an operation so colossal that it will be impossible to treat it from the standpoint of different fields of action. We must envisage the new Teutonic offensive and the resulting Russian retreat as a single great operation extending from the crest of the Carpathians to the shores of the Baltic. Before proceeding to a discussion of the detailed movements of the military forces involved, it is fitting that we should pause to review the situation in the spring of 1915, and to consider what were the Teutonic objectives and the general Teutonic plan of campaign.

### *General Geographic Relations*

**Defensive position of Russian front**

A map (Fig. 8) of the area covered by the Teutonic advance will enable us to appreciate some of the broader geographic problems involved in this great movement. First, let us note the position of the Russian armies on the last day of April, 1915, when the German guns along the Dunajec and Biala Rivers opened the campaign which was to drive the Slavs back across a belt of country measuring more than 250 miles in maximum width. From the Baltic Sea north of Memel the defensive line of the Russians ran eastward toward the Dubissa River, thence southward along or near that stream to its junction with the Niemen. Beyond this

point the Russians had been able to advance from behind their main protective screen of the Niemen-Narew barrier of river and marsh and hold the Germans at bay in the swampy forests farther west. South of the Vistula the Russians remained secure behind the almost continuous trench formed by the valleys of the Bzura, Rawka, Pilica, Nida, Dunajec, and Biala Rivers. Near Ciezkowice on the last-named stream the Russian line left the valley and, turning southeast over the foothills, crossed the main crest of the Carpathian Mountains and followed their southern slope eastward beyond the Lupkow pass. Recrossing thence to the north side of the range, the line followed the Stryj valley toward its junction with the Dniester and the northern side of the Dniester gorge to the Rumanian border.

**Influence of terrain on position of Russian front**

To state the position of this great battle front is alone sufficient to emphasize the importance of river, marsh, mountain, and gorge as defensive screens against enemy attacks. Even where the Russian line was not immediately associated with some striking topographic barrier, as for example the segment between the Niemen and Vistula Rivers, the main defensive position was usually along such a barrier but a short distance in the rear of the actual front. The Teutonic armies had for months been facing the series of obstacles named above, and repeated furious assaults against first one barrier and then another had ended in failure. What was there back of the barriers for which the Teutonic armies were fighting so strenuously, how did these armies finally break through the opposing obstacles, and to what extent were they successful in achieving the purposes for which they fought? Let us see what points of geographic interest are involved in the answers to these questions.

**Warsaw as a military prize**

Back of the artificially intrenched and naturally protected Russian line lay Warsaw, a fortified city guarding one of the few bridge crossings of the Vistula, a railway

center of the highest importance, and a political prize of the first magnitude, for the capture of which the German generals in repeated drives had vainly sacrificed hundreds of thousands of their best troops. Two direct assaults on the city failed, the first almost at the city gates, the second at the defensive line of the Bzura and Rawka Rivers. There remained the possibility of isolating the city and forcing its surrender by severing its railway communications. It will be seen from the map (Fig. 8) that Warsaw forms the apex of an important system of railways converging westward from all parts of the Russian Empire. For the sake of simplicity the most important lines alone are represented, and of these the line from Petrograd through Dvinsk, Vilna, Grodno, and Bielostok, and the lines from the east and south passing through Brest-Litovsk, Kovel, and Ivangorod were absolutely essential to the defense of Warsaw and to the supply and munitionment of the main Russian defensive positions which these railways paralleled for long distances. Attempts to sever the railway southeast of Warsaw ended in failure when the Austrian armies were defeated in their endeavor to advance through the marshy forests south of Lublin and Cholm early in the war, and when the Austro-German armies vainly attacked the great trench of the middle Vistula River. Similar attempts against the Petrograd-Warsaw line failed because the Germans were unable to cross the middle Niemen between Kovno and Grodno or the Narew-Bobr line of river and marsh farther southwest.

**Strategic railways and their natural defenses**

The Teutonic armies were sadly in need of a position for the coming winter which should have immediately behind and parallel to it a good railway line. This would enable them to shift their gradually decreasing supply of troops from point to point with the rapidity necessary to meet an enemy offensive or to bring overwhelming numbers to some particular point where a Teutonic offensive was contemplated.

**Other Teutonic objectives**

*Paul Thompson.*

**The broad barrier of the Vistula River crossed near Wyszogrod by a pontoon bridge. Note the sandbar islands in the stream which made the problem of bridge construction less difficult.**

**Fortifications bordering the Vistula River to render more difficult its passage by an enemy.**

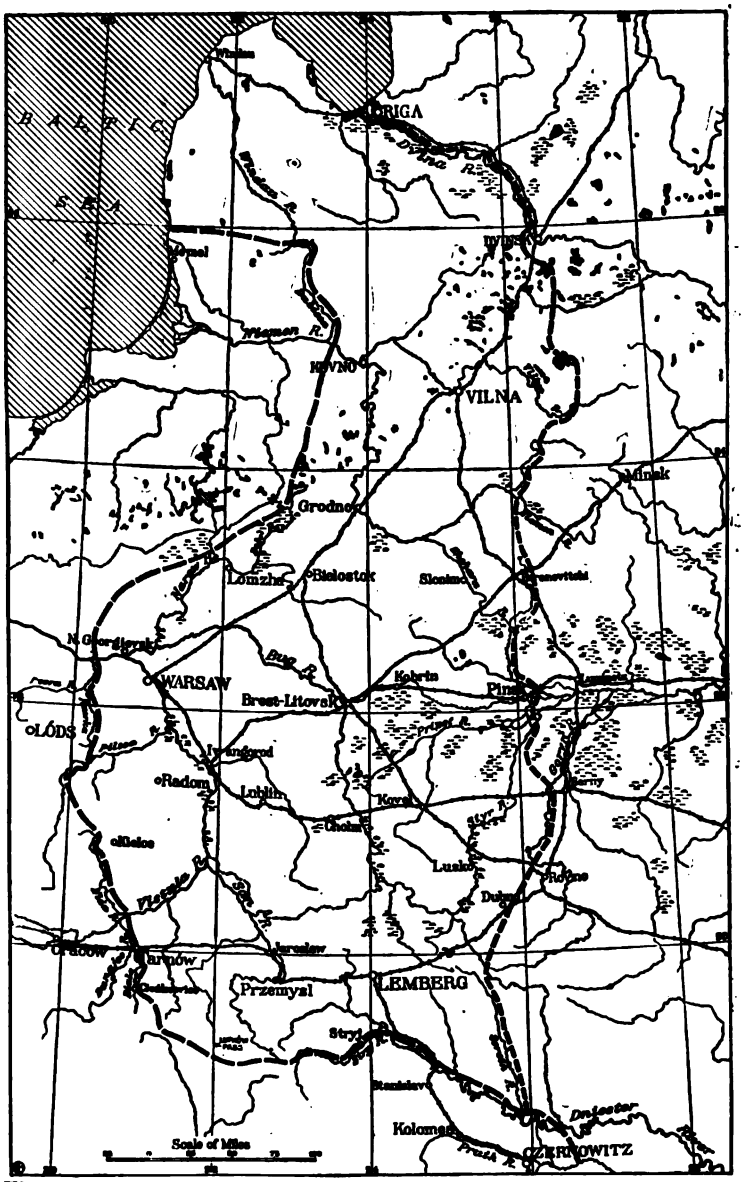


Figure 8. Positions of the Russian front before and after the great retreat of 1915.

It would also permit the munitionment of their troops so rapidly as to give them a great superiority in artillery duels. At the same time the Russian loss of the railway would decrease the mobility of their armies and place them at a fatal disadvantage in bringing to their front supplies of all kinds. If the railway loop Vilna-Bielostok-Warsaw-Ivangorod-Lublin-Kovel-Rovno could be broken near its apex and the fortifications of Warsaw and Ivangorod taken, the Russians would be forced back to the loop Vilna-Bielostok-Brest-Litovsk-Kovel-Rovno. The Austro-German armies then might hope to break the apex of this blunter loop at Brest-Litovsk and so push on to the nearly north-south line through Riga-Dvinsk-Vilna-Baranovitchi-Luminetz-Sarny-Rovno and its continuation to Lemberg-Kolomea-Czernowitz. Intrenched on the eastern side of this great line of steel stretching unbroken from Riga on the Baltic coast to Czernowitz near the Rumanian border the Teutons could bid defiance to the Russians operating at the isolated ends of widely separated railways in a difficult country where neither railways nor good wagon roads parallel their extended front.

**The principal objective**

But far more important than any of the above-mentioned prizes back of the Russian line was the Russian army itself. Wars are won by destroying the enemy's fighting forces, not by winning cities, railways, and good defensive positions. In the retreat which would follow the forcing of the Russian line the Teutons hoped to surround and destroy large sections of the Czar's armies. Unless this principal object of warfare was achieved, the other gains might not repay the fearful cost of a great general offensive.

**Balkan situation as affecting Teutonic plans**

We must not lose sight of one further prize of a political nature for which the Teutons were contending, for political events may profoundly influence or even determine military campaigns. Back of the Russian line lay the Balkan states, politically if not geographically. An Austro-German victory

involving the conquest of Poland would profoundly impress the wavering Balkan monarchs and might bring one or more of them into the fight on the Teutonic side. Russia herself might be so sorely bruised as to forsake her allies and conclude a separate peace. Failing this, the Russian armies could at least be temporarily paralyzed, thus permitting the transfer of large bodies of Austro-German forces from the eastern theater of war to the Franco-British and Italian fronts, where their aid was sorely needed. From the military standpoint the possible results of a great Teutonic offensive certainly justified expenditure of the hundreds of thousands of men already sacrificed in earlier endeavors to break through the topographic barriers protecting the Russian railways and the great hosts of Austro-German troops which would undoubtedly perish in renewed attempts to achieve success.

**Russia's outlets to the sea**

Why was it that the Russian position along the eastern wall of the Dunajec and Biala valleys, protected by a natural moat of such formidable character that Teutonic armies had suffered repeated defeats in earlier efforts to cross it, was finally broken by the assault which began the last of April? The answer to this question is largely geographical, and to appreciate it the reader should turn to a map of Eurasia showing principal railway lines. It will there be seen that Russian communication with the outside world is effected mainly through the five following routes: westward through the Baltic, or by way of Austrian and German railways across central Europe; eastward by the Trans-Siberian railway to the seacoast opposite Japan; southward through the Black Sea and Dardanelles to the Mediterranean; and northward through Archangel to the Arctic Sea. The roundabout rail connection with Scandinavian ports, involving transshipment of goods across a gap of several miles at the Russo-Swedish border, and the route, no longer available, up the

Danube to the Nish-Saloniki railway and so out to the Mediterranean, are neither one sufficiently satisfactory to be reckoned among the principal trade routes of the Russian Empire, although both have served a useful purpose and the former has been greatly improved.

**Isolation of Russia in war-time**

Since Russia is not a great manufacturing country and some of her most important munition factories have been destroyed by German spies, the supplies for her artillery must come largely from the outside world through one or more of the five routes just mentioned. But the German fleet and German mines closed the Baltic outlet; Austro-German armies bar the way to the Austrian and German railways; the Turkish forts at the Dardanelles still control the exit from the Black Sea; and through the long winter of 1915 Arctic ice sealed the only port on the northern coast. There remained the single railway, many thousands of miles in length, connecting the hungry cannon of the Russian front with the munition factories of Japan. When one considers how serious is regarded the loss of a single railway from among the complex network of lines serving a short segment of the Western battle front in France, one can perhaps appreciate the serious condition which confronted the Russian armies when a battle line nearly a thousand miles long became largely dependent on a single railway for its artillery supplies.

**Influence of Pro-German intrigue**

There was another factor involved, the importance of which was only later appreciated by the outside world. Pro-German intrigue was actively at work in the Russian capital and traitors among high Russian officials were secretly aiding the Teutons by interfering with the shipments of munitions to the front. Disarmed by treachery in the rear, the Russians were helpless before the Teutonic onslaught. It required no military genius to overcome unarmed forces with heavy artillery. The Teutonic commanders concen-

trated a large quantity of guns and munitions along the Dunajec-Biala front for a vigorous offensive. April 29th or 30th saw the opening of the campaign with a terrific artillery duel which lasted two days. Then the Russian field guns grew silent. Artillery supplies were exhausted and rifle ammunition greatly depleted. Troops which had easily held the Teutons at bay before the surrender at Przemysl released 250,000 of their comrades to help them in this task, now fell back in spite of the reinforcements because their guns had been starved all winter.

**Extent of German success and failure**

To what extent did the Teutonic offensive achieve its purposes? Warsaw was captured, Poland conquered, and a part of the railway system controlled. Bulgaria was influenced to join the Teutons, and the conquest of Serbia thus made possible. A glance at the map (Fig. 8) shows that control of the great north-south railway system from Riga to Czernowitz was not secured, for the Russians still held great segments of the line. From Riga to Dvinsk the Dvina River and its marshes had proven an impassable barrier to the Teutonic forces; from Baranovitchi to the Galician border the Shchara, Pripet, and Styr Rivers, a connecting canal, and the Pinsk marshes stood between the exhausted Teutons and their objective. The much coveted winter position was not secured by the Teutonic armies, and no satisfactory position was available to them without an extensive withdrawal of parts of their line. Both Slav and Teuton lost heavily in men, but no part of the Russian army was surrounded and destroyed. The primary object of every war was not achieved by the offensive, and the Russian armies at the end of the great retreat, instead of being broken and demoralized, were able to take up defensive positions behind topographic barriers in an orderly manner and to beat back their pursuers along parts of the line with smashing blows. Assault after assault at the northern end of the line profited the Germans

nothing; while an advance of the Russians in Galicia cost the Austrians heavily in killed and captured. No opportunity was afforded the Teutons to detach large bodies of their troops from the eastern front for service in the west or against Italy. Russia, instead of being ready for peace, was preparing a new offensive against the Teutonic line.

**Teutonic attempts to envelop the Russians**

The attempts of the Teutonic armies to envelop and destroy some portion of the Russian forces involved the creation of several dangerous salients in the Russian line, followed by an endeavor to close the neck of each salient by attacks from both sides and so to isolate the armies forming its apex. The campaign in Galicia drove the Russian left wing eastward to the Bug and Zlota Lipa, thereby creating the great Warsaw salient. Incidental to this campaign was the creation of an important salient at Przemysl. After the Warsaw salient had been straightened out by the withdrawal of the Russian center to the line of the Bug, the salients of Grodno and Vilna were in turn developed. The great retreat ended with the unsuccessful German attacks against Riga and Dvinsk. The rôle of land forms in the Galician and Riga-Dvinsk campaigns, and their skilful utilization by the Russian commanders in extricating their armies from every salient, form the subject of the following chapter.

# CHAPTER X

## THE GREAT RUSSIAN RETREAT

### *The Galician Campaign and the Przemysl Salient*

The point of weakness and its terrain

THE attack on the Dunajec-Biala line, which began the Galician campaign the last of April, was directed against the whole of this front; but, according to report, with especial vigor against Cieźkowice, where the lines of trenches left the Biala River to cross the hills toward the Carpathian crest (Fig. 9). Assuming the truth of the report, it is not difficult to understand why the locality mentioned should be a point of weakness in the Russian line. As described in an earlier chapter, both the Dunajec and Biala valleys are fairly open, flat-floored trenches with steep sides, which, with the streams meandering through them, form a natural moat of formidable proportions behind which the Russians had long maintained themselves in security. The function of these troops was to hold the Teutons at bay west of the moat, in order to protect those arteries of communication which extended from the main railway in the Tarnów-Jaroslaw lowland, up the northward-draining valleys to the Carpathian crest, through the Dukla, Lupkow, and other passes, and so to the Russian front south of the main ridge. Failure of munition supplies rendering the defending troops impotent longer to perform their function, the first break in their line might well have been expected toward the south where the natural trench of the Biala is smaller and the line of artificial trenches left its protection for a more southeasterly course. It is not surprising, therefore, that the southern end of the Dunajec-Biala line was bent back with comparative rapidity,

Figure 9. Map of the Galician terrain, showing successive defensive positions of the Russian armies in earlier stages of the great retreat. Long dashes, Russian position at beginning of retreat; short dashes, position back of the San-Dniester marshes; dots, position behind the Bug-Zlota Lipa-Dniester barrier.

whereas the northern end, near Tarnów and beyond, did not abandon its defensive position until about a week later.

**Weakness of supply lines in mountainous terrain**

A branching river system in a mountainous district has one serious disadvantage as a means of supplying an army front located near its headwaters. The supply lines for many miles of front must follow the courses of the upper tributaries of the trunk stream, since communication across the intervening mountain ridges is impossible. An enemy may therefore cause the precipitate retreat of a long segment of the fighting line stretched across a series of converging tributaries by threatening to capture a few miles of the trunk valley. It was for this reason that the Russian front south of the Carpathians abandoned the hard-won mountain passes and fell back to the north and east, when the weakening of their comrades' hold on the Dunajec-Biala trench jeopardized the supply line in the Wislok and Wisloka valleys.

**Rôle of river barriers in the mountains**

The slow retreat of the northern end and the more rapid retreat of the southern end of the Russian line in west Galicia was significant in several respects. That part of the Russian line just north of the Vistula trench could retreat but slowly through the dissected upland of southern Poland, and would have been exposed to a flank attack from the south had their comrades back of the lower Dunajec been forced eastward so rapidly as to leave a gap between the two parts of the line. The defensive value of the broad Dunajec valley was doubtless important in insuring a retreat south of the Vistula at a rate which would permit maintenance of an unbroken front with the slow-moving troops to the north. On the other hand, the rapid retreat at the extreme south made impossible any simultaneous alignment of the entire west Galician army back of the Wisloka or Wislok trenches during the retirement. Toward the end of the first week in May the Russian line was behind the upper Wisloka trench toward the south but cut across country to the lower Dunajec

farther north. A few days later it was back of the upper Wislok at the south, whence it cut across the hills to continue for some distance along the east side of the lower Wisloka. Not until the middle of May was the Russian line fairly well straightened out back of a continuous topographic barrier of the first importance, the San-Dniester belt of river and marsh. The character of this belt and its great importance as a defensive screen in earlier campaigns have already been described. As will appear from the map (Fig. 9) there is a narrow isthmus of dry land between the San marshes and the marshes of the upper Dniester. Hussaków stands near the center of this strategically important land gateway, while a small stream, the Wisznia, does its best to close the gap and make the San-Dniester barrier complete. From behind this most formidable river barrier in Galicia the Russians administered the first serious check to the great Teutonic offensive.

**San-Dniester barrier**

**Przemysl salient**

At this time the Russian front departed from the line of the barrier in three places. Toward the north Russian troops were able to check the Teutons before retreating as far east as the San and Vistula and were subsequently successful in a temporary advance in that region. Far to the southeast the forces of the Czar had emerged from behind the deep trench of the lower Dniester and, pushing the Austrians before them, had advanced to the line of the Pruth (Fig. 8), where they established themselves behind the defensive screen of that river. The third peculiarity of the line was at Przemysl, where it encircled the city to protect the removal of stores, munitions, and guns prior to the inevitable surrender to the enemy. This was the famous Przemysl salient, the first of four to be developed during the Russian retreat. It is the one in which topographical features seem to have played the least striking rôle.

The line defending Przemysl followed a curved course

over the adjacent foothills of the Carpathians and doubtless profited by the partially reconstructed fortifications earlier captured from the Austrians. On the south it stretched across the dry-land bridge past Hussaków, protected by no topographic barrier of importance. To close the neck of this salient and capture the portion of the line thus isolated, together with the vast quantity of military stores and guns remaining in the city and its forts, the Teutons fought one of the hardest battles of the Galician campaign. As the attack from the north would be hindered by the position of the San marshes, we should expect the Teutonic armies to concentrate their most strenuous efforts in an attempt to push northward from the vantage ground of the more favorable topography about Hussaków. This is apparently what occurred. Beginning the middle of May, one smashing assault after another was delivered against the Russian line at Hussaków, and at Lutków a short distance east. Day after day, for a week or more, these assaults continued. The neck of the salient was only twelve miles wide, or but six miles from either side to the railway over which the Russians were ceaselessly shipping the contents of Przemysl to Lemberg and the east. Austrian and German guns dropped occasional shells on the railroad; but the work of evacuating the city continued with little interruption until all the stores, munitions, and big guns were safely removed. Then the Russians, leaving a small rearguard to cover the movement, withdrew their main forces to the line of the Wisznia, thus straightening out the Przemysl salient. The first decisive attempt to envelop and destroy a large segment of the Russian line had failed, probably because the barriers of river and marsh in front of other parts of the line could be held with sufficient ease to permit a large concentration of troops at the Hussaków gateway to meet and defeat the main Teutonic attack.

**Terrain of the Przemysl salient**

**Russian escape from the Przemysl salient**

**Teutonic attacks on the San-Dniester barrier**

The Galician campaign could not proceed until the Russians were dislodged from behind the San-Dniester barrier. As was expected, the first blow for this purpose was delivered near Jaroslaw; for the Cracow-Jaroslaw lowland was the natural groove along which the Teutonic bolt could be fired with the greatest speed. It struck the San about May 14; lost momentum as it passed through river, marshes, and muddy slopes; and finally stuck fast on the opposite bank May 17. Meanwhile the operations against the Przemysl salient had begun. When the Russians surrendered the empty city about June 1 and withdrew to the Wisznia line, Mościska, near the center of the Wisznia barrier, bore the brunt of repeated assaults. Unable to penetrate the natural defensive screen in this region, the Teutons sought for success farther south. The marshes of the upper Dniester made a general offensive against that part of the line out of the question, while the gorge of the lower Dniester had long proven an impassable barrier to the Austrians. The point selected for

**Zurawno**

the next attack was therefore Zurawno, beyond the lower end of the great Dniester marshes, but above the beginning of the deep gorge. Although not on a railroad, Zurawno was chosen because its favorable physiographic situation more than compensated for the absence of direct railway communication. A violent assault carried the Teutons across the river June 6; but once more the difficulty of quickly transporting heavy guns and large supplies of bulky munitions across a river with deep channel, muddy flood-plains, and slippery banks brought the forward movement to a speedy end; and a few days later the Austro-German forces were driven back to the south side of the valley.

**Value of the Cracow-Jaroslaw lowland**

Meanwhile the Cracow-Jaroslaw lowland had been pouring a steady stream of munitions into the Jaroslaw region. With these accumulated stores at their command, overwhelming superiority in artillery fire again favored the Teutons.

Better means of crossing the San barrier must also have been constructed, since the troops which had reached the east bank during the first assault in May held a narrow strip of country there and so protected the engineers at work in the valley. A new offensive found the Russians unable longer to maintain their position in this section, and toward the end of June they retired to the Gródek line of lakes. At the same time an Austrian offensive along the Pruth drove the Russians back to their former position behind the Dniester gorge.

**Russian retreat from the San**

The Gródek barrier consists of a north-south string of lakes connected by broad belts of marsh through which rivers flow from one lake to another. Only an occasional narrow isthmus of dry land or an artificial embankment affords crossing to a railway or highway, as at Gródek and Komarno. Behind such a barrier a small body of troops could withstand the frontal attacks of vastly superior forces. But unfortunately the barrier is only twenty-five or thirty miles long; and while it connects with the Dniester barrier at the south, its northern end may be passed without difficulty. The Teuton armies ascending the gentle back slope of the Podolian Plateau did pass the northern end of the Gródek Lakes, outflanking the Russians and forcing their further retirement. Meanwhile, although all efforts of the Austrians to cross the Dniester in force had failed, more and more of the western end of this secure position had to be abandoned as the eastward retirement of the Russians progressively uncovered the upper Dniester.

**Halt at the Gródek barrier**

After the Russians withdrew from the Gródek line, those familiar with the topography of Galicia predicted that the next check to the Teutonic advance would occur when the north-south barrier of the marshy Bug with its braided channels was reached. The line of this stream may be regarded as prolonged to the Dniester by several of the parallel gorges descending the southern slope of the Podolian cuesta, of

**Retirement to the Bug-Zlota Lipa barrier**

which the Gnila Lipa is one. Behind this trench the Russians took up their position the last of June. The Gnila Lipa trench is less easily defended, however, than that of the Zlota Lipa farther east. This latter stream rises so close to the source of the Bug as to form with it one practically continuous barrier and is characterized throughout by high and steep valley walls and in its middle course by a flat floor dotted with lakes and marshes. To this better position the Russians at the south soon withdrew, thus bringing their front into perfect alignment with their comrades farther north who had by now securely established themselves behind the marshy flood-plain of the Bug (Fig. 9). Here the Teutons were held in check and the main Galician campaign ended; for the Warsaw salient was already strongly developed, and an attack upon it offered promise of greater returns than could an attempt to drive the Russians from behind so formidable a barrier as that of the Bug-Zlota Lipa-Dniester trench.

### *The Warsaw Salient*

**Attack on the Warsaw salient**

Leaving sufficient troops to hold the Russians behind the barrier just described, the Teutons turned their main forces abruptly northward to crush in the southern side of the Warsaw salient. About the same time an attack from the north drove the Russians back behind the Narew-Bobr line, and attacks against the west front caused a withdrawal to the protective screen of the Vistula. The supreme contest of the retreat was now fully joined, the prize consisting of Warsaw and central Poland; the apex of the railway system; the stores, munitions, and guns in the forts of Warsaw, Ivangorod, Novo Georgievsk, and those of the Narew-Bobr line; and, most important of all, that great section of the Russian army defending the enormous salient. If the Teutons push-

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**Great bridge at Warsaw destroyed by the Russians before their retreat in order to prevent the ready passage of the Vistula by the pursuing Germans.**

**German troops crossing the Vistula barrier to Warsaw on a pontoon bridge.**

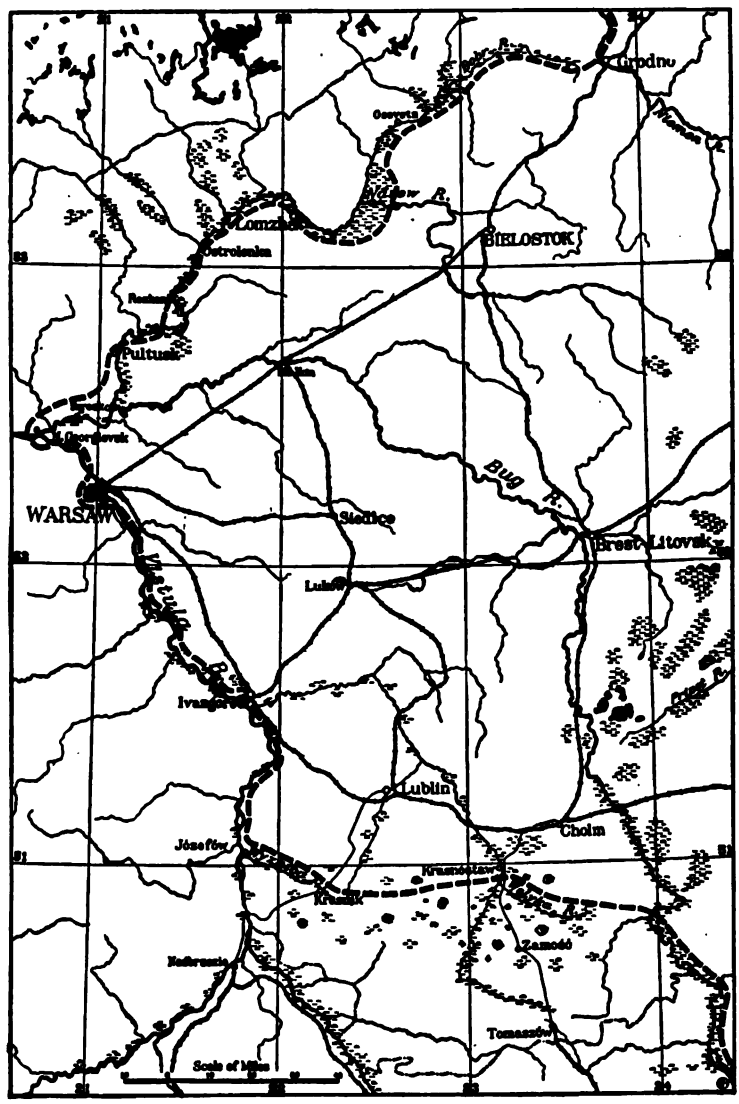
ing northward from the Galician border and those pushing southward from the East Prussian border could quickly squeeze the neck of this salient narrow enough, all the prize would be theirs.

Natural defenses and strategic railways of the salient

A map of the Warsaw salient (Fig. 10) makes clear the geographic elements involved. Nature had provided an admirable series of physical barriers for the defense of the salient, while man had constructed an excellent railway system back of and paralleling these natural defenses. The northern arc was protected by the Bobr and Narew Rivers with their almost impassable marshes, as well as by artificial fortifications erected at intervals along the streams. The strategic importance of this physical barrier and the repeated failure of German attempts to force it have been described in an earlier chapter. Back of this line and supplying its defenders is that portion of the Warsaw-Petrograd railway included between Warsaw and Grodno. Between Novo Georgievsk and Józefów the western arc of the salient is defended by what has often been called the most serious military obstacle in Europe,—the deep, broad trench of the Vistula with its steep walls, flat marshy floor, and swift river of majestic volume, unfordable and seldom bridged. Parallel to it and serving its defenders runs the Warsaw-Ivangorod railway. The southern arc, from the Vistula to the Bug, has as its protective screen a marshy forest through which the most practicable means of communication consist of two narrow causeways uniting the nearest rail ends at the Galician border with Lublin and Cholm. Parallel to this front is the railway running eastward from Ivangorod through the two towns just mentioned. All of the peripheral railways are further supplied by branches radiating from the central part of the salient.

The German problem

The problem of the Germans on the north was to break through the Narew-Bobr screen and push southeast across




Figue 10. River and marsh barriers protecting the Warsaw salient. Broken line shows approximate position of Russian front.

the Warsaw-Petrograd railway toward Brest-Litovsk, while their comrades on the south advanced through the marshy forest and across the Lublin-Cholm railway toward the same point. If the two wings could advance even at moderate speed, the lines of Russian retreat would be cut and the trap would close before stores, munitions, guns, and men could possibly be withdrawn to the east. Meantime the army west of the Vistula was to play the subordinate rôle of holding the Russians engaged behind that barrier until the weakening of their line by withdrawal of men should render the crossing of the stream feasible. The Russian problem was so to utilize the natural defenses as to prevent a Teutonic advance; or, failing this, to render the advance so slow that ample time would be available for the complete evacuation of Warsaw, Ivangorod, and other fortified places, and the withdrawal of the main body of troops before the railways to the east should be cut.

**The Russian problem**

The advance on Lublin and Cholm was undertaken by an Austrian army moving along the Krasnik causeway and a German army moving along the Zamość causeway, both armies being supplied from the railway termini near the Galician border. (The causeways are indicated by hair-lines on Fig. 10). At Krasnik the Austrians encountered the Russians lined up back of the marshy valley of the Wyznica River. Frontal attacks against this barrier seem to have been unsuccessful; but it appears that farther east the Austrians were able to advance around the head of the river where the ground was dryer and so to flank the Russians out of their defensive position. Progress was extremely slow, however, the defense of the narrow causeway in a marshy forest being overcome only with the greatest difficulty.

**Battle of Wyznica River**

Similar difficulties were encountered by the German army when they found their advance along the Zamość causeway contested by Russian forces intrenched behind the marshy

**Battle of Wolyka River**

barrier of the Wolyka River, just south of the town of Krasnostaw. A fierce battle was fought before the Germans were able to dislodge the enemy from his position of advantage and capture the town. The average rate of advance along the causeways for both Austrian and German forces was less than a mile a day. At this rate the southern jaw of the trap would never close in time to catch the Russian bear. The supply of artillery and munitions from distant bases by means of the two congested causeways traversing difficult country was far too slow to render the southern armies capable of striking quick, effective blows. It became evident that dependence for Teutonic success must be placed in the northern armies under Von Hindenburg. Although the southern armies were within ten miles of Lublin and Cholm on July 18, it was not until the end of the month that they reached the railway and cut one line of Russian retreat.

**Von Hindenburg's attack on the Narew-Bobr barrier**

For the purpose of smashing through the Narew-Bobr line Von Hindenburg, who knew from painful experience the difficulty of the task, had at his disposal an enormous army, fully equipped and plentifully supplied with accumulated stores of ammunition. The attack began about the middle of July. In the course of a week or ten days small bodies of German troops succeeded in breaking through the barrier at isolated points but were unable to press these slight gains. Two weeks more of hard fighting failed to secure an average gain of half a mile a day at any point. About August 1 the Russians began the evacuation of Warsaw and Ivangorod in an orderly manner. The forts were dismantled, the stores and big guns shipped east by rail, and everything of military value removed or destroyed. Meanwhile the Teutons had succeeded in crossing the Vistula in force above Ivangorod. With a thin screen of rearguard troops holding the defensive lines, the bulk of the Russian army was now transferred

eastward to its new position. One of the most brilliant retreats in military history was thus accomplished, because the physiographic character of the Narew-Bobr line enabled the Russian rearguard to hold at bay vastly superior forces under Von Hindenburg and so retard their movements that more than a month of furious fighting netted them an advance of less than twenty miles. It was near the middle of August when the Russian rearguard began to retire, and the Teutonic forces were allowed to close the empty trap.

**Russians escape from Warsaw salient**

Novo Georgievsk forms an exception to the rule that the Russians removed men, guns, and munitions from their forts before retiring; for here the forts remained intact and a considerable body of troops was left to garrison them. Since there was ample time to evacuate these forts as perfectly as were those at Warsaw and Ivangorod, it may be wondered why guns and men were left to the certain fate of ultimate capture. The explanation of the mystery is geographical. In an earlier chapter it was pointed out that while the Vistula was a formidable barrier to an attacking enemy, it was an admirable supply line for the forces which controlled it. As soon as the Warsaw salient should be evacuated this supply line would become available to the Teutonic forces following the retreating enemy, and boats pushing southward up the river to deliver stores and munitions all along the rear of the eastward moving armies would enormously facilitate a vigorous offensive. This could be prevented, however, so long as the guns of Novo Georgievsk kept the barges of ammunition and other supplies assembled in the lower Vistula from ascending the stream. Hence the sacrifice of men and guns to delay for two weeks the Teutonic use of the middle Vistula.

**Novo Georgievsk prevents use of middle Vistula**

### *The Grodno Salient*

Similarity to Warsaw salient

In the continued eastward retreat of the Russians following their escape from the Warsaw salient, there was developed, early in September, an important salient with the fortress of Grodno at the apex. Reference to a map (Fig.

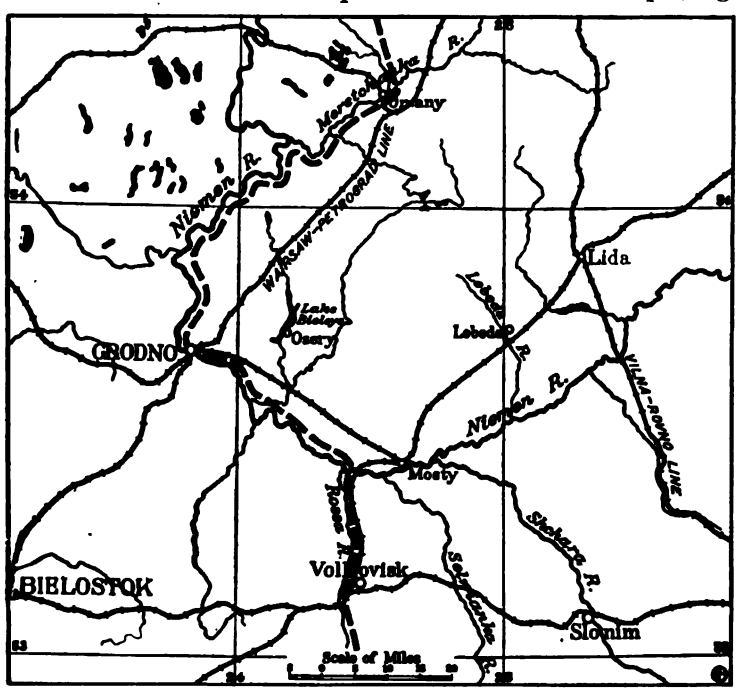



**Figure 11. Natural defenses of the Grodno salient. Broken line shows approximate position of Russian front.**

11) showing the approximate position of the Russian forces at this time will make clear the striking resemblance between the smaller salient and its greater prototype about Warsaw. Let Grodno stand for Warsaw, the Niemen-Meretchanka barrier for that of the Narew-Bobr, the Niemen from Grodno to Mosty for the Vistula, the Rossa River for the north-south

segments of the upper Bug, and the strategic relations will be apparent without detailed discussion of them. Even the railway lines occupy strikingly similar positions within the salient; and the most important difference in the two cases is that the south side of the Grodno salient is not prolonged as far eastward as in the Warsaw case, the Russian line turning south along the Rossa instead of continuing eastward to follow the Shchara, which would have made a better equivalent of the Bug.

**The problem**

The task which confronted the Teutons was to cross the barrier of the Niemen north of Grodno or, better still, the Meretchanka, which was nearer their objective, and cut the Warsaw-Petrograd railway; and at the same time to cross the Niemen between Grodno and Mosty in order to cut the only other line by which the forces about Grodno could retreat. For their part the Russians must hold the Teutons on the farther side of the river barriers until Grodno was evacuated and the troops at the apex of the salient could escape. As in the Warsaw case, the principal Teutonic attack seems to have been directed from the northwest; but unlike the larger example, it would appear that Grodno fell as the result of direct assault about the 1st of September. To crush in the apex of a salient is, however, to achieve a comparatively small result. The railways back of the barriers must be reached and cut if the retiring army is to be destroyed. A week after the fall of Grodno the Germans were still battling vainly to cross the Meretchanka on the north and the Rossa and Niemen on the south. Aided by topographic obstacles the Russians were able to make good their escape. When the Grodno trap closed it, too, was empty.

**Russians escape from Grodno salient**

A few days later the Russians behind the Rossa fell back to the east bank of the Selvianka, where the Teutons advancing along the Bielostok-Slonim railway were held at bay for

some time and compelled to fight a hard battle for the rail-crossing over the river. A further retirement to the line of the Shchara was then effected, the troops of the salient having meanwhile retired to the Lebeda line.

### *The Vilna Salient*

**Strategic railways and their natural defenses**

Before the fate of the Grodno salient had been fully settled, or about the beginning of the second week in September, the development of the Vilna salient began. Retreat from Vilna could be effected by three railways: northeastward toward Dvinsk by the Warsaw-Petrograd line, here defended first by the Viliya River and later by the much smaller Shemyana, which runs parallel to and west of the railway for thirty-five miles; southeastward by the Vilna-Minsk line, protected on the north by the Viliya River and a series of lakes and marshes; and southward through Lida by the great north-south Vilna-Rovno line described in the preceding chapter, which, in this region, is protected by several small streams and marshes between Vilna and Lida, and farther south by the Lebeda and Shchara.

**Development of the salient**

When the Russian line, pressed by the pursuing Teutons, took up its position along the Viliya and Shemyana Rivers, a very slight salient was created with Vilna as the apex. Heavy assaults intended to break through the barrier and cut the railway immediately behind it achieved success about September 12, when German troops crossed the Shemyana near Sventzyani and severed communications between Vilna and Dvinsk. It is worthy of note that the assaults were successful where the smaller river formed the railway's only protection. The Russian troops now fell back to the south behind the more formidable barrier of the Viliya in order to protect the Vilna-Minsk line; and for days the despatches recorded the furious attempts of the Teutons to secure "the

fords of the Viliya." German cavalry moving rapidly southeast reached Vileika September 17. The Vilna salient was now developed in its most acute form, the position of the Russian front at this time being roughly as represented in Figure 12.

About the same time that Vileika was captured the Ger-

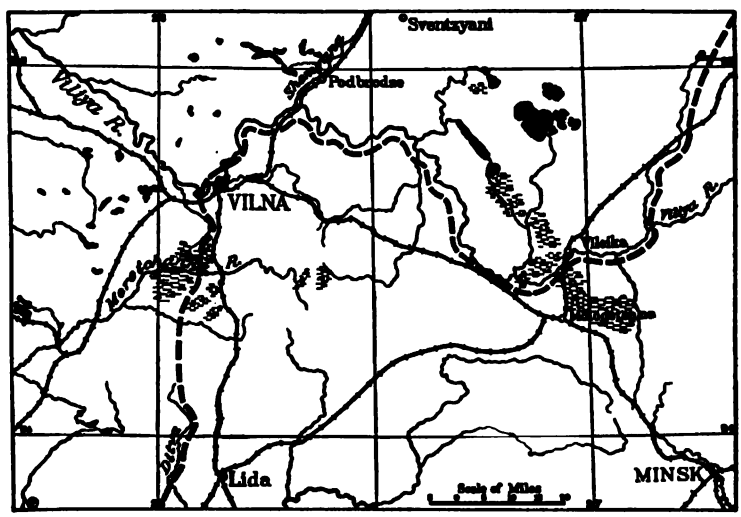



**Figure 12. Approximate position of the Russian front (broken line) when the Vilna salient was most strongly developed.**

mans forced a passage at the fords of the Viliya north of Vilna, thus breaking through near the apex of the salient, and likewise forced a passage of the Shchara south of Slonim (Fig. 11) thereby rendering retreat southward by the Vilna-Rovno line dangerous. There remained another avenue of escape, the Vilna-Minsk railway; but this was temporarily closed about September 18 when by a rapid dash over the Viliya German forces reached the vicinity of Molodetchno junction and seriously threatened the main line at that point. The same day German troops entered Vilna.

**Closing the salient**

Russians force opening and escape

A great body of Russian troops was now caught in the Vilna salient, and every avenue of escape seemed in German control. Berlin rejoiced at the first success of the Teuton armies in closing one of the famous salients with a large prize inside. But the joy was premature. Truly the trap had closed; but its jaws were too weak for the size of the bear it had caught. The inadequate German forces at Molodetchno were hurled back across the Viliya, the defensive line reëstablished, the railway opened, and the Russian armies and their equipment safely removed to a new front farther east.

### *The Riga-Dvinsk Campaign*

Scope of the campaign

While the operations about Grodno and Vilna were still in progress, the extreme left of the Teutonic line was attacking the region of the lower Dvina River. About August 1 the important railway center of Mitau was taken by the Germans, and the campaign for the possession of Riga and Dvinsk began. Before long the ablest German generals and their best seasoned troops were here engaged in some of the most furious fighting of the war. For many months first Riga and then Dvinsk were subjected alternately to desperate assaults which cost the Germans an unbelievable toll in killed and wounded and gained them nothing. A naval battle for control of the Gulf of Riga formed part of the operations directed against the city of the same name.

Strategic railway

The accompanying map (Fig. 13) gives the geographic answer to the question, "Why did the numerous German offensives against Riga and Dvinsk fail?" Between these two cities runs the northern segment of the north-south railway system previously described as essential to the Germans if they were to establish themselves on a satisfactory winter line in the east. Parallel to the railway, and protecting it on the

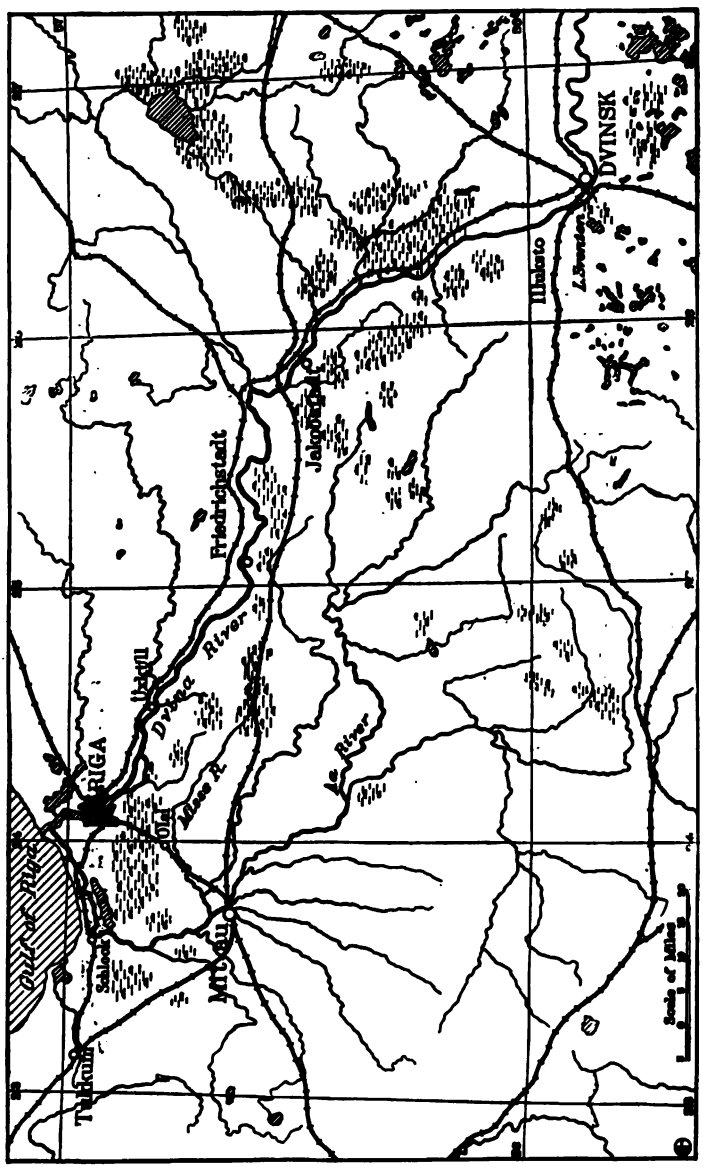



Figure 13. Natural barriers in the Riga-Dvinsk region.

southwest, is the broad, deep current of the Dvina River. Southwest of the river is a belt of marsh which adds materially to the defensive strength of the natural barrier. With but few exceptions the marshland is devoid of roads and practically impassable for troops,—wholly so for heavy artillery. At its northwestern end this topographic barrier is protected from a flank attack by the Gulf of Riga and the lower course of the Aa River; at the southeast similar protection is afforded by the belt of lakes and marshes south of Dvinsk, forming the continuation of the morainic belt of East Prussia, and by the east-west course of the Dvina River. Seldom has a strategic railway been more securely situated behind natural fortifications.

**Nature of the terrain**

**Operations against Riga**

We may divide the campaign for the Riga-Dvinsk line into three parts: first and most important of all, the operations against Riga with the object of turning the right of the Russian defensive line; second, the attempts to break the line at Friedrichstadt and elsewhere by frontal attacks; and third, the efforts to capture Dvinsk and thus turn the left of the forces behind the river. The assaults against Riga began with an advance from Mitau along the Mitau-Riga railway, early in August. About half-way between these two points is the small town of Olai, important to us because it marks the place where repeated German attacks ended in failure. Immediately north of Olai is the great Tirul marsh; just south is the Misse River flowing through a marshy forest. One German assault after another failed to penetrate one or both of these topographical barriers, and the name Olai has thus come to be associated with costly Teutonic defeats with which the town and its artificial defenses had little or nothing to do. German successes in the east were usually achieved through the effective use of very heavy artillery in battering down the resistance of the lighter Russian guns. Wherever marshes restricted the use of heavy

**Tirul marsh**

artillery to the narrow front offered by a railway embankment or causeway through the wet country, Teuton and Slav met on more equal terms, and the Teuton offensive languished.

Advance from Tukkum

After several weeks of costly but unsuccessful assaults against the marshy barrier from the south, the Germans shifted their forces to the west and attacked from the direction of Tukkum. In reports of this fighting the town of Schlock figured prominently, for reasons readily apparent from the map. The lower Aa River makes an effective north-south barrier which has its northern end at Schlock. Here the river turns east and flows parallel to the gulf coast for many miles, as if deflected from its normal course by a broad sandbar deposited under the influence of an eastward moving current in the gulf. South of the deflected river and increasing its value as a barrier is a long narrow lake known as Lake Babit. The Tukkum-Riga railway follows the bar between river and gulf for some miles before crossing the river on its way to Riga. It appears, therefore, that the north-south segment of the Aa River, reinforced on the east by the Tirul marsh, interposes an impassable barrier to any advance south of Schlock; while the logical route along the railway would compel the attacking forces to advance in column on a narrow ridge of land flanked on both sides by bodies of water from which or across which Russian guns could direct a deadly flanking fire. Topographic conditions would seem to render impossible any hope of a successful attack against Riga from the west; yet the Germans struggled fiercely to capture the city from this direction. The name of Schlock is naturally associated with their failure to penetrate the physical barriers near that town. The naval engagement for control of the Gulf of Riga ended in favor of the Russians and thus assured to their right flank the protection of the sea.

Lake Babit

**Capture of Friedrichstadt**

In attempting to break through the Dvina river and marsh barrier the Germans succeeded in capturing Friedrichstadt near the center of the line early in September and may even have thrown some troops over the river to the north bank. This degree of success was favored by the parallel railway close to the river on the south, from which one of the few roads through the marsh connects with the town. But the consummation of the success thus begun was rendered impossible because of the obstacles presented by both river and marsh to an advance with front sufficiently broad to make the crossing of the river effective; and because the country north of the river is a marshy forest, largely devoid of roads, through which the troops which may have crossed could make but little progress. The railway last mentioned

**Jakobstadt**

bridges the Dvina near Jakobstadt, and the Germans were thus aided in an attack near that town which brought them close to the river, but apparently not to its northern bank. Near Üxküll several islands in the river afford opportunity for a crossing which would further be aided by the fact that small streams from the south provide facilities for constructing pontoons in safety behind the German lines and floating them down into the main river in the shelter of the islands. A heavy bombardment of Üxküll led the Russians to anticipate a crossing here, but apparently it was not effected, the unfavorable topographic elements more than counterbalacing those favorable to such an operation.

**Natural defenses of Dvinsk**

The campaign against Dvinsk failed because of the inability of the Germans to get past the lakes, marshes, and streams guarding the southeastern end of the Riga-Dvinsk barrier. Dvinsk is protected in the first instance by a great bend in the Dvina River which forms a natural moat on all sides but the north. Beyond the river to the west and south lie the marshes and lakes often mentioned in the despatches.

**Lake Sventen**

Lake Sventen to the west, with its associated marshy forest,

proved a particularly formidable obstacle to many attacks; while the marsh to the southeast checked a flank attack from that quarter. The losses suffered by the Germans in their frequent attempts to storm the passes between the lakes were most serious. Indeed, the terrific but fruitless assaults against the natural fortifications of the whole Riga-Dvinsk region, covering a period of many months, created appalling casualty lists and materially weakened the chances of the Germans to conduct successful offensive movements in the future.

**End of the Russian retreat**

A similar weakening for a similar cause took place at the southern end of the eastern front, where the Austrians and Germans who had pushed their offensive to the Goryn and Sereth Rivers were later thrown back to the line of the Styr and Strypa, with heavy losses in prisoners as well as in killed and wounded. On the other hand the Russian armies, protected by the troops lined up back of the Dvina-Pripet-Styr-Strypa barrier, secured an opportunity to reform their shattered forces, equip another group from their almost limitless supply of fighting men, and so confront their enemies in a few months, as strong or stronger than they were in April, 1915, when the great retreat began.

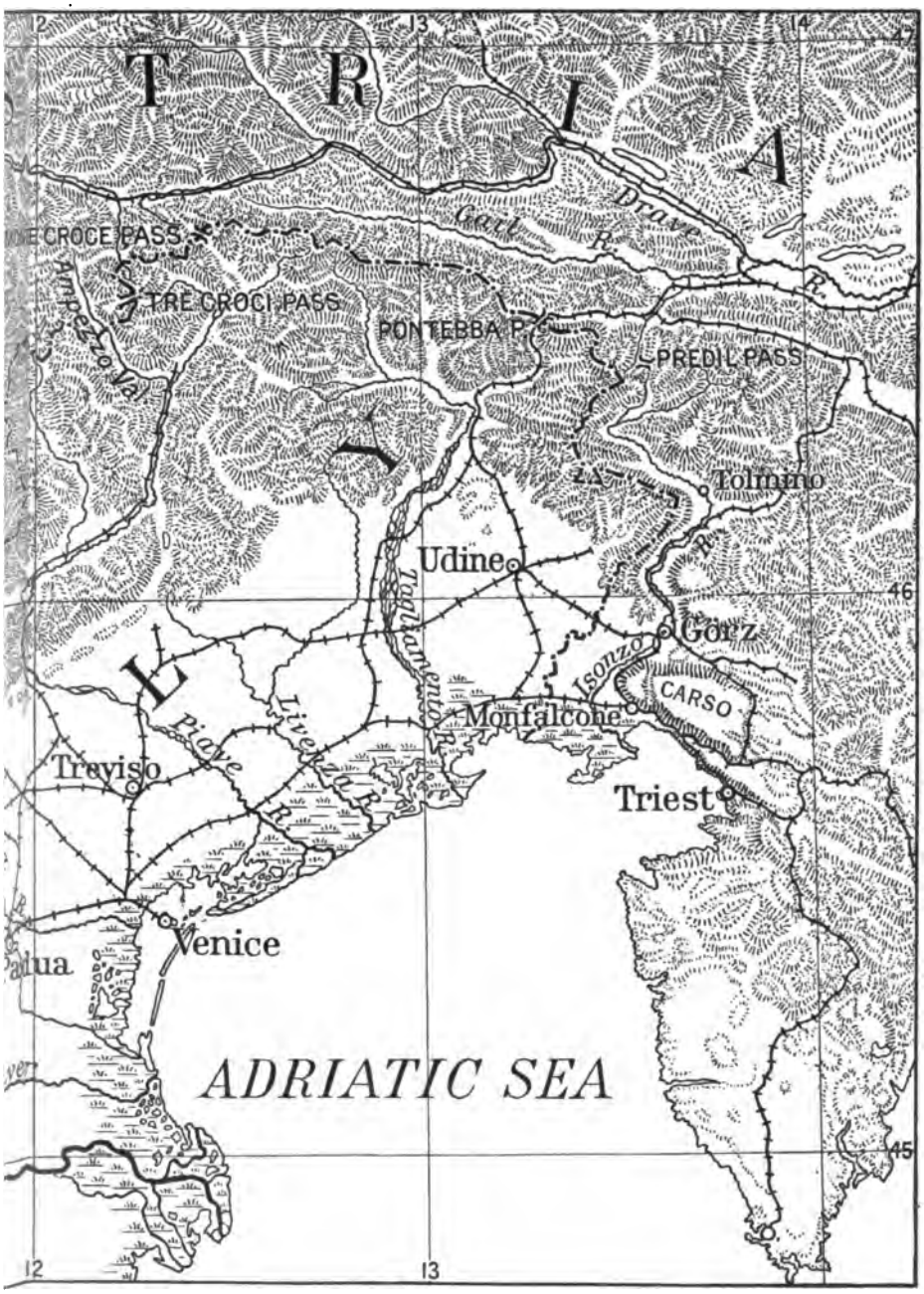
**Later operations**

It would not be profitable to trace the fluctuations of the Russian line since the end of the retreat. For the most part such a treatment would be but a repetition, with minor variations, of matter already presented. In the south we find the Russians, after their advance to the trench of the Strypa, pushing forward in a new offensive until the Teutons brought them to bay along the middle course of the formidable Zlota Lipa trench. Farther north an advance from the Styr brought the Russian line to the banks of the Stochod, where their move against Kovel was abruptly halted. This small river flows through a maze of marshes and lily ponds bordered by a higher bank on the west, from which the Teuton artillery and machine guns commanded the difficult crossing.

**The Stochod barrier**

Despite the most desperate fighting the Russians were unable to make an effective breach in this barrier, and one of their most important offensives was here permanently blocked. In the summer of 1917 another Russian offensive in Galicia was only checked at the Lomnica River by internal disintegration of the advancing forces. Even when German intrigue had successfully employed as its tools the shameless traitors and ignorant dreamers of Russia in a campaign of demoralization which wrecked the fighting power of the great Rusian armies, the influence of topography still manifested itself in the south, and we find the fleeing troops first making an effective stand behind the trench of the Zbrucz River on the border between Russia and Galicia. No more eloquent testimony to the demoralization of Russia's military power could be offered than a mere statement of the fact that in 1917 German armies in the north far weaker than those of 1915 passed with ease the same Riga-Dvinsk barriers which proved absolutely impregnable so long as Russian troops formed heroic fighting units instead of radical debating societies.

Figure 14. The Italian theater of war, showing the principal mountain and




and plateau barriers, river trenches and marshes, affecting the Italian campaigns.

# CHAPTER XI

## THE ITALIAN THEATER OF WAR

### *Italy's Problem*

Slow progress of Italian armies

In May, 1915, Italy declared war on Austria-Hungary. There were among the friends of the Entente many who believed that Italian armies would quickly overrun the southward projecting peninsula of Austrian territory known as the Trentino, and perhaps sweep round the northern end of the Adriatic and occupy Trieste. When months and even years passed by, and *Italia Irredenta* still remained unredeemed, disappointment was not unmixed with criticism of the new ally's apparent inaction. A study of the natural obstacles blocking every path of Italian advance will show that the disappointment resulted from entertaining hopes unduly high, and may perhaps tend to mollify such spirit of criticism as may still persist.

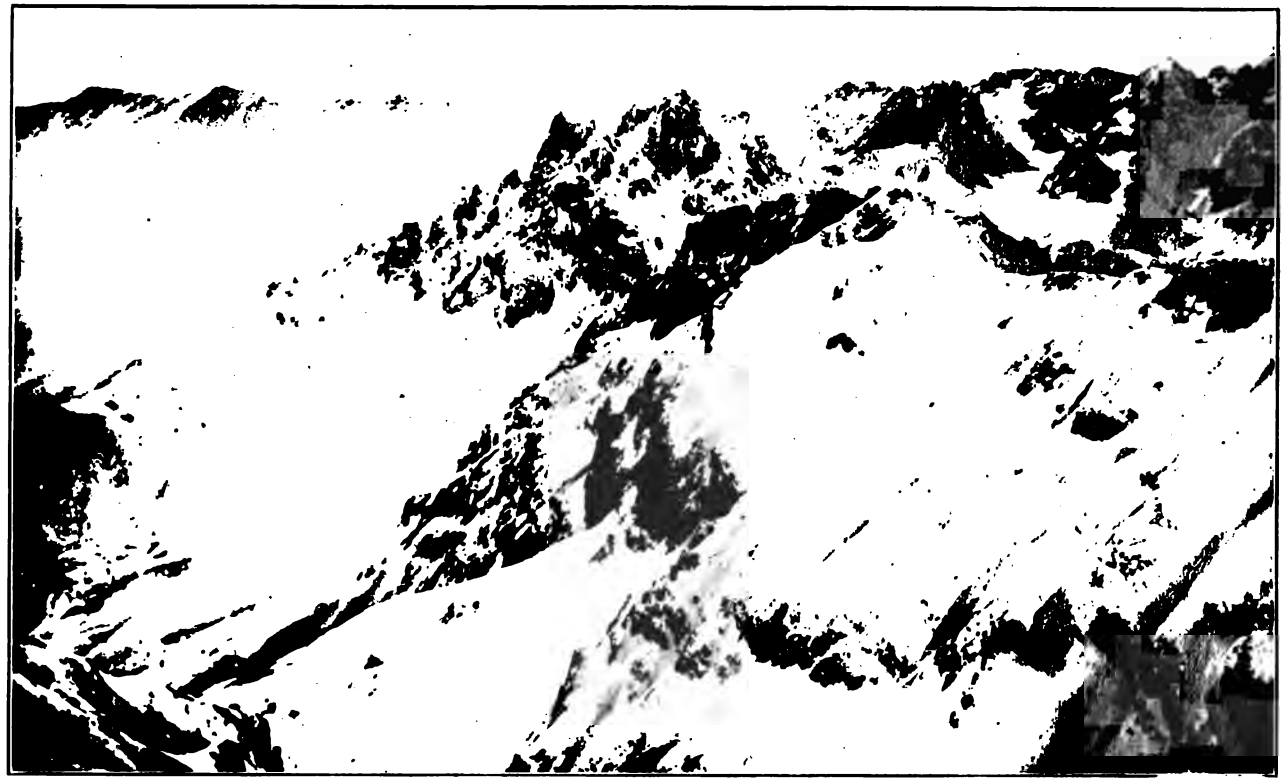
Terrain of the Alps

The Alps consist of a complex system of rocks intensely folded and broken, and deeply dissected by stream erosion. Among the rock masses are great limestone formations, in places totaling thousands of feet in thickness, with which we will have particularly to deal. Because the rock masses were raised from ten to fifteen thousand feet above the sea in their higher parts, streams cut remarkably deep canyons and left a country most difficult to traverse. The difficulties were increased a hundred fold when the ice streams of the glacial period flowed down the valleys, cutting them much deeper, steepening the valley walls into rocky precipices, leaving the side valleys hanging hundreds of feet above the

floors of the overdeepened main valleys, sharpening the intervalley ridges into knife-edge arêtes, and carving the dome-shaped peaks into jagged needles and horns. The resulting topography was one of indescribable ruggedness, in which precipitous cliffs, inaccessible peaks, steep-sided divides, and hanging valleys present to the engineer almost insurmountable difficulties. Roads and railways are for the most part restricted to the bottoms of glacial troughs and to the few passes across intervening ridges. Where they are forced against the rocky wall by a lake occupying the trough floor, or lead upward over dissected mountain slopes, tunnels and bridges are numerous. Military movements through such a country must of necessity be slow; the lines of advance are few and narrow, and easily blocked by the destruction of bridges and tunnels; they are dominated by commanding peaks from which hostile artillery can be dislodged only by a slow and painful advance over most difficult topography; and important passes must be wrested from the control of the enemy under conditions which make defense easy and offense hazardous.

**Terrain of the Piedmont plain**

Stretching southward from the southern foothills of the Alps is the alluvial plain of the Piedmont, formed of rock débris eroded from the mountains and spread out in great fans along the mountain base. The rivers which made this alluvial deposit flow southeastward down its slope to the Po or to the Adriatic, some with meandering courses while others were so overburdened with débris that they developed a braided pattern about countless island sandbars. Near the sea the plain is very low and marshy, and characterized by extensive lagoons back of narrow barrier beaches. This lagoon and marsh belt varies in width from ten to thirty miles or more, and interposes a serious obstacle to the movement of troops; but between the marshes and the mountains only the transverse rivers oppose the ready advance of armies over



*Central News.*

Imposing barrier of the Trentine Alps as seen from an Italian outpost on Monte Pasubio.

the level surface of the plain. These rivers have played an important rôle in Italian military history in the past, and may conceivably do so again in the near future.

Position of the frontier

Almost all of the Austro-Italian frontier lies in the difficult country of the Alps. Only at the extreme east does the international boundary descend to the plain and run across its nearly level surface for twenty or thirty miles to the head of the Adriatic Sea. Even here an important advance from Italian to Austrian territory is not so easy as might appear from the definition of the frontier; for just east of the political boundary the Piedmont plain ends abruptly against the base of the mountains which bend southward from the Alps to border the Dalmatian coast. No appreciable advance into Austria is possible except over difficult mountainous country.

Strategic disadvantages of Italy's frontier

That portion of the international boundary lying in the Alps is located in a position which, from the standpoint of military strategy, is highly unfavorable to Italy. It lies close to the southern edge of the mountains, near the Piedmont plain. Austria has the advantage of possessing most of the rough country as a bulwark against Italian aggression, but may herself sweep down upon the Italian plain with a minimum of difficulty. The boundary follows minor crests, dominated by higher ridges to the north from which the Austrians may often look down upon the Italian frontier as from an aeroplane. In part it runs transverse to the grain of the country, repeatedly descending to a low level in order to cross the bottoms of main glacial troughs and minor valleys which trend roughly from north to south. Through these valley depressions Austria may move downstream across the boundary into Italy with comparative ease. Italian troops must always work against gravity, moving up valley and up mountain slope in advancing into Austria.

The plains portion of the frontier is easily crossed in

either direction. But just east of the boundary line, and parallel to its bendings, is the Isonzo River, its upper portion occupying a glacial trough in the mountains, its lower part flowing with a somewhat braided pattern through a marshy flood-plain on the sloping surface of the Piedmont, to end on a delta projecting into the head of the Adriatic. This natural line of defense is not only the first obstacle to a further invasion of Austria, but also serves as a special protection for the important railway line just to the east which connects the interior of Austria with its principal seaport, Trieste. East of the railway rise the mountains already mentioned, terminating the Piedmont plain in this direction, and offering an almost impregnable bulwark against an Italian offensive.

**Terrain of the Isonzo region**

Should the Italian offensive fail, and Austrian troops invade Italy, the advance would probably come from the Trentino on the north or from Gorizia on the east. From the base of the mountains to the margin of the lagoon belt there is no serious natural obstacle to troops advancing from the north. Armies moving from the east, on the other hand, would have to cross one after another of the parallel rivers which flow down the slope of the plain. These successive defensive lines would be utilized by the Italians to retard an Austrian advance, and should cause invading armies serious embarrassment. Some of the rivers, particularly the Tagliamento and the Piave, have an extraordinarily braided pattern, the interlacing network of channels being crossed by good roads only at infrequent intervals. On the banks of both these streams important military actions have occurred in the past, and in this respect history will repeat itself if during this war the Teutonic allies prove able to prosecute an extended invasion of Italy from the east. In this connection it is interesting to note that when Italy entered the war not a few of her citizens feared a modern irruption

**Natural defenses against an Austrian advance**

**The Tagliamento River**

of the Huns from beyond the Isonzo, and had resigned themselves to the possibility of an invasion as far west as the Tagliamento. It was realized that this historic barrier, with its multiple channels and shifting sandbars, flanked on the north by Alpine ridges and on the south by coastal marshes, would undoubtedly put a check on the advance of the foe, and perhaps mark the western limit of the invasion.

Italy's grievances against Austria consisted not alone in the fact that Austria dominated and threatened the southern country from a frontier topographically well-nigh impregnable, but from the further fact that much of the territory north and east of the boundary was Italian in speech and sentiment. Both to regain her unredeemed territory and to remove the constant menace of hostile attacks from her hereditary enemy, Italy requires a boundary nearer the crest of the mountains which will give her some control over the main gateways into her dominions.

**Italy's grievances against Austria**

Whatever the outcome of the war, some rectification of the present frontier to the advantage of Italy may confidently be expected. Such rectification was, indeed, the subject of negotiations between Austria and Italy prior to the latter country's entry into the war in 1915. Austria at that time proposed to cede to Italy a portion of the Trentino or "Süd-Tirol" as it is illogically called by the Germans. The territory which Austria was willing to abandon to prevent Italy from joining the Allies coincided roughly with the extension of Italian language north of the Italian frontier. Italian demands were based, however, as we have just seen, upon strategic necessities as well as linguistic considerations. They therefore outlined a frontier farther north, nearer to the Adriatic watershed. In a general way this line ran eastward from near the Swiss boundary, through Klausen to the vicinity of the Tre Croci pass (see Map p. 121), thus giving Italy control of the exits from the two

**Proposed boundary changes**

upper branches of the great Etsch valley leading southward into Italy. Of these the easternmost is of greatest strategic importance, since through it comes the main railway from Germany over the Brenner pass, and the strategic railway which runs parallel to the frontier for nearly one hundred miles on its way eastward to Vienna. The fact that the proposed boundary was to cross this eastern branch valley at Klausen, a "close" or narrow pass in the valley, emphasizes Italy's desire to secure a location for the dividing line which should be topographically adapted to effective defense. The old Bishopric boundary from 1106 A.D. to the Reformation followed this line. If there is any flaw in this proposed rectification of the Italian Trentino frontier it is due to the fact that the Bozen district, thereby incorporated in the southern kingdom, is Teutonic in speech and feeling, although economically it is Italian.

**Austria's offer**

The line upon which Austria was willing to agree strikes south in such manner as to avoid cession to Italy of any territory of German speech. In doing this, however, it leaves some of the Italian-speaking northeastern districts of the Noce valley in Austrian territory. All the mountain outlets which converge into the Etsch valley are also retained by Austria. From the Italian standpoint this is inadmissible, as it would leave the southern country unduly exposed to unwarranted aggression from the north. To the impartial observer it would seem that the Italian claim offers the more equitable division of those strategical advantages which each nation considers essential to national security. It would leave to Austria the watershed, a position admirably suited for defense; and would at the same time award to Italy the control of the outlet passes. Each country would thus find itself secure from sudden aggression on the part of the other. The Austrian offer, on the contrary, altogether disregards Italy's strategical necessities.

**Typical terrain of the Italian front in the Dolomite Alps of the Trentino.**

With this general survey of the Italian frontier and its problems we may turn our attention to the campaigns for Italia Irredenta and examine them to find what features of the topography have most profoundly affected the fighting in this theater of war. It will immediately appear that there are two principal fields of operations, the Trentino front and the Isonzo front. Let us consider these in the order mentioned.

Two Italian fronts

# CHAPTER XII

## CAMPAIGNS FOR ITALIA IRREDENTA

### *The Trentino Front*

**Italian objectives**

THERE were many reasons why the Trentino should be the object of one of the two campaigns first undertaken by Italy. As a "lost province" largely inhabited by Italians its occupation was calculated to inspire enthusiasm in the army of liberation and in the breasts of the people who must support the army. As a salient of hostile territory thrust far into Italy the Trentino constituted a danger which could be removed only through its conquest. Of all the glacial troughs leading southward through the Alps, the valley of the Adige (Etsch) which bisects the Trentino from north to south is one of the most remarkable, and is economically and strategically the most important. Its flat floor, from less than one mile to more than two miles broad, is traversed by two excellent carriage roads and by a railroad of the highest possible strategic value. By way of the low Brenner pass (4,495 feet) both carriage roads and railway afforded the chief means of communication between Italy and Germany, while the railway was the only line by which Austria could send reinforcements, ammunition, and supplies to the Trentino. The fortified town of Trent, and the outlying fortress of Rovereto, twelve miles farther south, both lie in this same trough. It was the richest valley, the chief commercial route, and the easiest natural line of invasion open to the Italians, besides containing the towns whose capture would have the greatest military significance. (See Map, p. 121.)

**The Adige or Etsch valley**

*Central News.*

**A trench in the rocks and snows of the Alps. Note the snow-laden barbed wire entanglements in front of the trench.**

Fortunately for Italy there are other routes of invasion converging on Trent, so that the difficulties of advancing along the narrow Adige valley were to some extent offset by the opportunity of coöperation with supporting columns in neighboring valleys. The southern apex of the Trentino peninsula may be entered through the glacial trough just west of the Adige, occupied by Lake Garda and the Sarca River, or farther west by the parallel trough occupied by Lake Idro and the Chiese River, and known as the Giudicaria valley. Italian armies advanced northward through all three of these glacial troughs, and fierce fighting took place on Monte Baldo, the high ridge which separates the Adige and the Garda-Sarca troughs and dominates military operations in both.

**Routes of invasion**

**Giudicaria valley**

From the two sides of the Trentino peninsula flank attacks against the Adige valley and its important railway were possible by way of other glacial troughs and mountain passes. On the eastern side the great trough of the Brenta River, known as the Val Sugana, may be followed westward to where it heads on a low col at the very gates of Trent. A railroad through the valley adds to its strategic importance, and a large Italian army moved on Trent by this route. Other armies attacked the Monte Croce pass (5,374 feet), Tre Croci pass (5,932 feet), Ampezzo pass (5,066 feet), Fugazze pass over the southern shoulder of Monte Pasubio, the passes of the upper Assa and Astico valleys, and other openings by which carriage roads cross the mountain ridges from Italy into the eastern side of the Trentino. On the western side an important advance was begun through Tonale pass (6,181 feet). From all sides of the Trentino salient the fighting was promptly carried into Austrian territory.

**Val Sugana**

**The passes**

It may be doubted whether the Italian supreme command expected the immediate conquest of the Trentino. The difficulties in the way of an offensive in this wild mountainous

**Italian plan of campaign**

region are colossal, and it may well be that Cadorna elected to hold the Austrians at bay here with inferior numbers, while he concentrated his energies in the campaign for Trieste. To remove the menace of an Austrian invasion and to contain their armies within the Trentino for a period of months or possibly years, demanded that every gateway into Italy should be seized and sealed by the Italian armies. This alone involved a prodigious effort by Cadorna's soldiers, who were compelled to attack the problem from the disadvantageous lower ground south of the frontier. No army could be safe on the Isonzo front so long as its lines of communication, which crossed the Piedmont plain just south of the Trentino, were threatened by any possibility of an advance from that district; hence the gateways must be held in absolute security. This could best be done by pushing through them into Austrian territory and fortifying their northern approaches. If the Austrians were not in sufficient strength to prevent a continued advance and the early conquest of the province, so much the better.

**Blocking the passes**

Whatever his immediate objective Cadorna acted with vigor. The armies striking north through the three parallel trenches of the Adige (Etsch), Garda and Giudicaria glacial troughs captured the fortified town of Rovereto and advanced almost within sight of the capital city of Trent, thus removing the threat of an irruption of the Huns through the southern exits from the Trentino. On the west the Stelvio, Tonale, and other minor passes were securely blocked. On the east the army in the Sugana trough left the frontier some miles behind it, while the high passes farther north were seized and firmly held. By quick action and heroic endeavor the soldiers of the south had neutralized to some extent the advantages initially held by their enemy of the north.

Let us pause for a moment to picture to ourselves what this mountain warfare of the Trentino is like. Nowhere

else in the great war have soldiers of the Allied armies encountered such appalling obstacles as confronted the famous Alpini of Italy. Nowhere else is warfare so amazing, so spectacular. The wildest regions of the Vosges, the most difficult mazes of the Balkan ranges, the most formidable barriers of the Carpathians, are tame as compared with the towering precipices and icy peaks of the Trentine Alps. Here no continuous line of trenches is possible; solid rock defies the spade and the only soil is often that carried up from below in sandbags to be used as breastworks. Elsewhere piles of stones give uncertain protection, and during a bombardment more men are sometimes killed by flying rock splinters than by shrapnel. Occasionally trenches are cut in snow or in ice. The troops are scattered in groups occupying strategic points and observation stations on high peaks, rather than disposed along a nearly continuous front. Even where trenches exist they are not always constantly occupied as on the Western front. The opposing lines are often necessarily far apart, and observers on the peaks can warn the defenders of an enemy attack in ample time for them to assemble in whatever section of trench may be threatened.

**Mountain warfare in the Trentine Alps**

Artillery fire in the Vosges may start landslides creeping down the slopes, loosened by the concussion of the big gun discharges; but in the Alps avalanches of snow and ice have resulted, which, descending the precipices, have overwhelmed men and guns on the slopes below. In the high altitudes frost action shatters the solid rock into blocks and slabs, producing the *felsenmeer* so well known to the mountain climber. Both Austrian and Italian troops have utilized this natural ammunition, piling the rock masses high on temporary platforms projecting over the cliffs, and releasing the whole at the proper moment to fall with crushing force upon the enemy below. In the solid limestone of some of the peaks galleries and observation posts have been hollowed

**Avalanches due to artillery fire**

out, from which the movements of the enemy may be observed without fear of the heaviest bombardment. One Austrian stronghold captured by the Italians comprised an elaborate system of gun chambers, ammunition storage vaults, officers' rooms, and connecting tunnels, all comfortably heated and well lighted by electricity, and all hollowed out of the solid rock.

Subterranean galleries and chambers

In point of numbers the troops engaged along a front of this type may be surprisingly small. We read of an important peak being captured by twenty-five men, or of an attack on a high pass by one company of infantry supported by a few field guns. Large forces cannot move in such a difficult terrain; and if they could, it would not be possible adequately to supply them. Ordinary means of transportation must be supplanted by aerial trams or "teleferic railways," wire rope cables stretched from peak to precipice and equipped with baskets sliding on a grooved pulley. In these small containers food supplies, field guns, and ammunition are raised to apparently inaccessible heights, and the severely wounded are brought down two at a time. Heavy artillery must be dragged up the steep slopes and hoisted over vertical precipices by cables of special strength running over pulleys and operated by man-power; for batteries of big guns at elevations of nine and ten thousand feet, thundering above the clouds, form part of the incredible warfare on the Italian front. The uniform of the soldiers includes a white cap and coat to render them invisible on snowfield or glacier, while skis, ice-axes, and alpenstocks form an essential part of their equipment. Battles are fought in this land of the clouds in which the attacking forces must cross the icy surface of a glacier in order to reach the enemy lines.

Teleferic railways

Military mountaineering

Even on the slopes below the highest peaks the problem of supply is a difficult one. Sure-footed mules are much in use, but they alone cannot solve the problem. What were

Military transport in the Alpine terrain

Central News

Military transport service in the high Alps of the Trentino. Two Italian scouts traveling on the teleferic railway.

steep mountain trails a few years ago are perforce used as roads in the pressure of war. Auto-trucks with transverse cogs projecting from broad iron tires creep slowly up the zig-zag paths. The army engineers have triumphed over the obstacles of Nature to the extent of transforming many of the trails into a network of mountain roads, with stone or steel bridges over the torrents. These will remain when the war is past, and will aid Italy in developing the lands she may conquer. Today they minimize but do not obviate the difficulties of transportation in the Trentine Alps. In addition to munitions, food, and other supplies, water in enormous quantities has to be brought up in casks to the high plateaus and ridges, and distributed to the men scattered far over the rugged terrain. Every offensive must be preceded by an accumulation of water to go forward with the troops, as well as by accumulations of shell to make the advance possible. Nowhere in the Alps is warfare simplified, although the lower ridges permit operations on a somewhat larger scale than would be possible in the higher regions of perpetual winter.

**Water supply**

An effective picture of Italian mountain warfare is given by an observer * on the Trentino front, who shows an unusual appreciation of the topographic difficulties encountered by the soldiers of Cadorna's armies. "Monte Cristallo, which dominates the Ampezzo basin, on the Italian side, shows an almost vertical face nearly 5,000 feet high. The Alpini attacked it armed with ropes, climbing-irons, and rock-drills. For a week they worked at the escalade, ignored by the Austrians, who never expected that any attempt could be made to reach them up this apparently insurmountable cliff. But the pioneers drove rings and iron pegs into the wall of rock, and from day to day mounted higher, while their comrades followed up the ladder they had made. Grad-

**Conquering an Alpine peak**

* Sidney Low in "Italy in the War."

ually they collected in the gullies and clefts under the summit; and then one night they stole out on the crest and rushed the Austrian garrison, too surprised and dismayed to offer more than a feeble resistance to these shouting groups of fierce foes, who seemed to have descended upon them out of the clouds."

**Preparations for Austrian offensive in Trentino**

When the first Italian advance into the Trentino had been checked a few miles within the border, the invading armies settled down to the slow and painful conquest of the formidable terrain, peak by peak and ridge by ridge. Meanwhile the Isonzo campaign was well under way, and was giving the Austrian high command not a little uneasiness. To check operations in this eastern field and to punish the Italians for their alliance with the Entente, a vigorous offensive was undertaken by the Austrian armies. Heavy reinforcements of men and enormous quantities of supplies and munitions were brought down the Adige valley, and concentrated about Trent. The process of accumulation was necessarily slow, for through the single narrow trough of the Adige all the men and supplies, big guns and munitions had to pass to their destination. Means also had to be devised to distribute water to the great armies during their advance. When the number of men exceeded a third of a million, and the massed batteries numbered a couple of thousand guns of all calibers, the blow was struck, about the middle of May, 1916.

**Location of Austrian main attack**

Apparently the Italians had not believed that the Austrians would be able to accumulate such masses of men and stores in the Trentino, and were taken by surprise. Their advance posts were crushed by sheer weight of numbers, and fell back rapidly. The main attack came in the mountainous triangle south of the Val Sugana and east of the Adige valley. In the center of this district the Austrians recaptured the mountain passes and pushed southeastward into Italian

territory. For a week, for two weeks, for three weeks, the furious battle went on, the Austrian invaders creeping painfully forward, capturing a peak here and a ridge there by virtue of enormous sacrifices of men and prodigal use of heavy artillery. The higher peaks were left behind and the Italians forced out over the Asiago plateau, a broad upland closer to the border of the mountains. Not far beyond lay the low level Piedmont, and the railways which were vital arteries, giving life to the Italian armies on the Isonzo front. A few miles more, and the Austrians could debouch on the plain, cut these arteries, take the Isonzo armies in the rear, and possibly overwhelm them with irretrievable disaster.

**Advance over Asiago plateau**

But the Austrian machine was beginning to lag. Its advance over an impossible terrain was destroying its momentum. Frontal assaults against mountain peaks and ridges stubbornly defended by the agile Alpini took a terrible toll in killed and wounded; lines of supply were lengthening, and food, water, and munitions had to be brought farther and farther over wild mountain trails; at the end of a month the accumulated surplus of men and munitions had been consumed in driving the Italian army back through a comparatively few miles of the rugged Alps; there was no reserve force to push them on to the plain beyond. Now was Cadorna's opportunity. With a hastily gathered new army he fell upon the exhausted Austrians toward the middle of June and slowly beat them back over the rough country, through which they had just come. The Austrian invasion was turned into an Austrian retreat. One hundred thousand much needed men and countless stores of munitions of war had been wasted in a vain effort to break through the mountain barrier to the fair plain of northern Italy. With his lines of communication secure, Cadorna was free to turn his attention once more to the Isonzo campaign.

**Difficult terrain defeats Austrian offensive**

**Austrian retreat**

### *The Isonzo Front*

**Terrain of the Isonzo region**

Standing on the Italian border southeast of Udine, one has before him a broad panorama of plain and mountain. In front of him stretches the smooth Piedmont sloping gently toward the sea. Down this slope from north to south the Isonzo River takes its sluggish way, choked with numberless sandbars and wandering through marshy flats. Low dikes hold the waters in check lest they flow too far over the adjacent lowland. Beyond the river rises a steep mountain wall, even-crested toward the south, but merging into the complex mass of Alpine peaks farther north. Directly opposite, the towers of the Austrian city of Görz,—Gorizia since its capture by the Italians,—are visible in a wide recess in the mountain wall formed by the broad Wippach valley. South of the city the even crest of the wall is the top of the far-famed Carso plateau; while on the north the Bainsizza plateau stands guard on the other side of the city. West of the river a long spur of the Julian Alps runs south to protect the city gates.

**Natural fortifications guarding Gorizia and Trieste**

Such are the natural fortifications blocking the way to Trieste. The route to that port along the sea follows the southern base of the Carso plateau, while the other route, via Gorizia, ascends the Wippach valley. Imagine yourself west of the Isonzo, attempting the task of the Italian army. Gorizia, an important field base, is one of your first objectives. There it lies just beyond the river, nestling securely in its mountain fastness. You approach the treacherous Isonzo and find the bridges partially destroyed. The guns of Monte Sabotino and Podgora on the spur of the Julian Alps fire upon you from the north; the guns of Monte Santo, San Gabriele, and San Daniele, high points on the rim of the Bainsizza plateau, threaten you from the northeast; the guns of Monte San Michele on the crest of the Carso belch

**Figure 15. The Isonzo front, showing the Carso and Bainsizza plateaus and the mountain peaks which formed the principal Austrian strongholds.**

steel upon you from the south. Boats and pontoon bridges are destroyed in this hurricane of cross-fire, and you begin to realize that you cannot cross the river until you have captured the protecting mountains, and cannot reach the mountains until you have crossed the river. You are ready to believe the memorandum said to have been issued to the Austrian soldiers at the beginning of the struggle on the Isonzo front: "We have to retain possession of a terrain fortified by Nature. In front of us a great watercourse; behind us a ridge from which we can shoot as from a ten-story building."

**The impossible task**

To achieve the seemingly impossible task of crossing the Isonzo under heavy fire, storming the heights of the Carso and Bainsizza plateaus and the Alpine peaks, and capturing the mountain-walled fastness of Gorizia was the first problem which confronted the Italian armies. The story of the successful solution of that problem will live long in the annals of Italian warfare. The wonder is not that the task took so long, but rather that it was ever accomplished. War was declared by Italy on the evening of May 23, 1915. Cadorna struck without a moment's delay, and by morning his armies had swept across the boundary on the level plain, and were capturing Austrian towns in swift succession as they rapidly advanced toward the Isonzo barrier. How the river was crossed under murderous fire will only be known when the whole story is told after the war. We hear of pontoon bridges destroyed and renewed with feverish activity, of boats and rafts braving the hail of steel, and of soldiers plunging into the stream in the race for victory. We know that a foothold was speedily gained on the eastern bank at some places, while weeks went by before other portions were crossed.

**Crossing the Isonzo barrier**

**Defensive use of floods**

During one of the crossings at the very base of the Carso the river was in flood, and by opening the dikes the Austrians

*Central News.*

**Bridges over the Isonzo River at Gorizia under fire. A bursting shell is seen at the left, while in the stone bridge one arch has been destroyed. The Podgora foothills of the Julian Alps form the background.**

deluged the surrounding country to depths as great as six feet. To reach their objective the Italians were forced to push through the flooded districts, fully exposed to a galling fire from the long scarp of the plateau, to repair the dikes and permit the floods to subside, to cross the river and fight their way through muddy flats to the base of the cliffs, and then painfully to work their way up the steep rocky slopes to the fortified upland above. Every step of this difficult journey was made under fire from high peaks and plateau scarps which encompassed the attackers on three sides, every step was exposed to the enemy's view as he looked down on the plain from his high observation stations, and every step meant the destruction or conquest of enemy fortifications long believed to be impregnable. Can one marvel that the Italian advance was slow from the moment the Isonzo barrier was reached? From Monte Sabotino and Podgora on the north to Monfalcone on the south the first wave of the Italian advance dashed against the rocky barrier along the river, and was checked. A year was to pass before the Latin tide would rise high enough to overflow the crest of the Teuton dam.

**Italians checked at the mountain barrier**

Gorizia could not be taken nor the routes to Trieste opened up until a part at least of the formidable Carso plateau had been wrested from Austrian control. It is not easy adequately to conceive the stupendous difficulties of the Carso terrain. The plateau is a flat-topped mountain from four to six miles broad, which runs parallel to the coast and at no place far from it. Its sides are precipitous, and as it rises from three or four hundred to more than a thousand feet above the surrounding lowlands, it constitutes a gigantic rock-walled castle whose guns control with ease the city of Gorizia, the crossings of the Isonzo, and the two pathways to Trieste. Its lower slopes are partly wooded, but higher up the steep rimming scarp is bare and rocky. Merely to

**Steep walls of the Carso**

scale the walls is therefore a military feat of no small magnitude.

**Rocky desert of the Carso upland**

The upland surface is a hot, thirsty, wind-swept desert. The rock is limestone, and its ready solution permits the development of underground channels by which all moisture quickly escapes to great depths. Scanty vegetation relieves but slightly the barren aspect of this desolate land without rivers, brooks, or springs. It is the typical dry, rocky desert of the karst type, for which its name, Carso, is the Italian equivalent. Like other karst lands the surface is excessively irregular, pitted with sink-holes without number and undermined by subterranean caverns. The sink-holes, or "dolinen," are funnel-shaped depressions from fifty to several hundred feet in diameter and fifty or a hundred feet in depth. They end in passageways connecting with the vast labyrinth of underground caves and galleries. Over the surface rise many low hills and an occasional mass of more imposing dimensions, like the Monte San Michele. Nature thus provided ready to hand innumerable concealed sites for heavy artillery, machine gun emplacements, observation stations, and secure underground retreats for vast numbers of troops. And what Nature offered the Austrians had accepted and improved by long years of elaborate fortification. Trenches had been cut in the solid rock, elaborate systems of galleries and tunnels had been excavated, gun emplacements had been prepared in pits quarried for the purpose, and the whole system connected by covered communication trenches and supplied by water pumped up to the thirsty surface and distributed by pipe lines.

**Monte San Michele**

**The Vallone**

The western end of the plateau is cut off from the main Carso by a deep trench, plainly visible on the map (page 137), called the Vallone. Thus even should the Italians cross the Isonzo barrier, scale the rocky walls of the plateau and conquer Monte San Michele and the rest of the western

*Italian Official Photograph.*

**Line of trenches on the Carso front.**

upland (sometimes called the Doberdo plateau), their further progress would be disputed at the deep, wide trench just described. South of the main plateau are outlying hills like the Hermada, which must also be conquered before the main road to Trieste can be opened. These rise as high as the Carso itself, and cannot therefore be dominated from the main tableland. Each such natural fort must be taken by storm as the armies make their way slowly along the coast.

Doberdo plateau

The Hermada

Such was the formidable terrain which the Italian armies set about to conquer. Once over the lower course of the Isonzo, with Monfalcone and Gradisca securely in their hands, they attacked the walls of the plateau all around its western extremity. Day after day, week after week, they burrowed up the barren slopes, driving deep trenches in the solid rock farther and farther toward the crest, boring great tunnels hundreds of yards in length which should ultimately open within a few yards of the Austrian main defenses. Spade and intrenching tool were useless here, and the miner's pick, drill, sledge-hammer, and dynamite were called into play. Sandbags, brought up from the plain below, were built into breastworks which afforded the workers some protection from the deadly flying splinters of rock dislodged by the enemy's constant artillery bombardment.

Italian conquest of the difficult terrain

Farther north the same methodical preparations were being carried out against enemy strongholds on the peaks of the Alpine spur west of the Isonzo. Rock trenches were being driven toward the works crowning the hills north of Podgora, while the almost inaccessible positions on Monte Sabotino were secretly being reached by a tunnel more than a mile in length. Week after week, month after month, the laborious task was pursued, early assaults having convinced Cadorna that the bravery of his troops would not alone make possible the conquest of a terrain where all the topographic advantages favored the enemy. What surface conditions

Trenching and tunneling

made impossible he must achieve by an advance underground.

**Second Italian offensive**

At length, in the first week of August, 1916, more than a year after the first Italian soldiers had crossed the Isonzo, the second Italian blow at the Austrian barrier was struck. A terrific bombardment from the greatly strengthened Italian artillery preceded the attack. Then the troops concentrated in the tunnels and deep rock trenches burst from the ground within a few yards of the astonished Austrians.

**Scaling the Carso**

The crest of the Carso from Monfalcone around to and including Monte San Michele on the north was carried by storm. In the Alpine spur the Podgora positions were seized and the supposedly impregnable Monte Sabotino passed into Italian hands. Gorizia was still held by the enemy, and the road to Trieste was far from open. But the advance had begun which should slowly creep forward till Gorizia was no longer tenable by Austrian troops, and Italian artillery pounding on the Hermada should demand an entrance into the port of Trieste.

**Gorge of the upper Isonzo**

North of Gorizia the Isonzo flows in a deep glacial trough, bordered on the east by the Bainsizza plateau and on the west by more irregular spurs and peaks of the southeastern Alps. This trench long held the Italian armies at bay, even when its northern course had successfully been crossed and Tolmino brought under Italian fire from captured positions on Monte Nero. At intervals Cadorna's soldiers crossed the river on pontoons under heavy fire, and dug themselves in on the lower levels of the Bainsizza plateau. Slowly they pushed their trenches up the steep slopes toward the crest

**Third Italian offensive**

and went "over the top" to capture Monte Cucco on the westernmost edge of the upland. A year after Monte Sabotino fell we find Monte Santo and Monte San Gabriele, just across the river, passing into Italian control, while Monte San Daniele, a neighboring peak on the edge of the

Italian sharpshooters on a peak overlooking the deep gorge of the Isonzo River in the mountains north of Gorizia.

Bainsizza plateau, was to hold out still longer. The wild upland surfaces of Bainsizza and the Carso were slowly being conquered by the relentless advance of Cadorna's men, and the Austrians were losing their grip on the strategically important Chiapovano valley separating the Bainsizza and Ternovano plateaus and connecting the Austrian front with the railway in the rear. Incredible deeds had been accomplished by Italian arms, but more than two years of almost superhuman effort had not served to open the rocky gateway to Trieste.

# CHAPTER XIII

# THE BALKAN THEATER OF WAR

## *The Balkan Barrier*

**Balkan situation in 1915**

NEAR the head of the Adriatic there rise several small streams whose waters flow almost due eastward through the Save and Danube Rivers, to empty into the Black Sea. South of this west-to-east river trench, and separated by it from the open plains of Hungary and Rumania, lies the rudely triangular mass of complex mountainous country known as the Balkan Peninsula (Fig. 16). The bulk of this difficult terrain long stood as an effective barrier between the Central Empires and their Turkish ally. The northwestern corner of the triangle, comprising Bosnia and Herzegovina, was largely under Austrian control, while in the eastern corner the Turks were effectively resisting all attempts of the Allied armies and navies to dislodge them. But the rest of the territory was either openly hostile to the Teutonic powers, or was maintaining a wavering neutrality which constantly embarrassed communication with the Turks and threatened to become an active menace at any moment. It was to resolve this intolerable situation and to impress the world by a decisive military achievement that the German General Staff planned the Balkan campaign of 1915.

## *The Morava-Maritza Trench*

**Two strategic river trenches**

Through the mass of the Balkan Mountains rivers have cut two great trenches which constitute the only important lines of communication in the region. One of these passageways

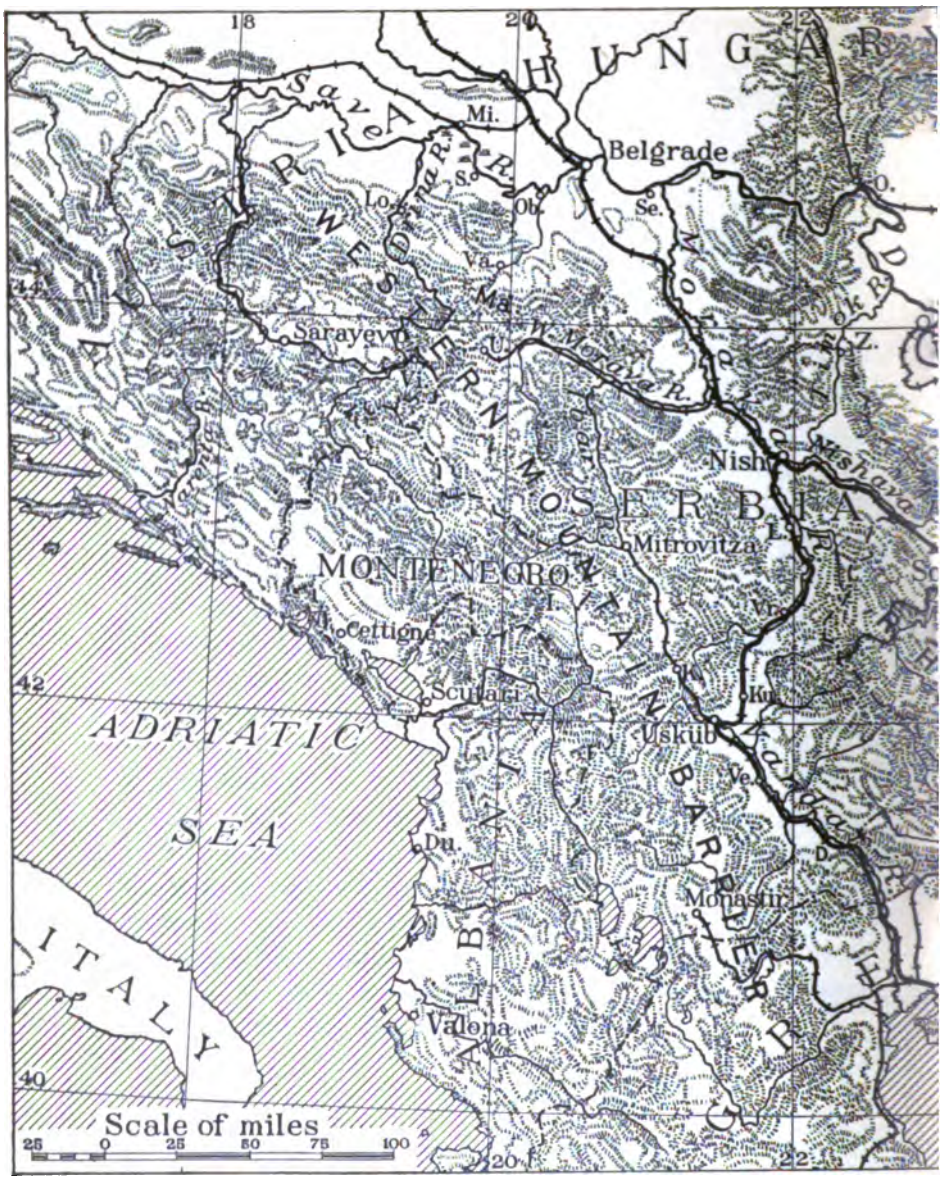



**Figure 16. Map showing barriers a**

***Abbreviations.*** **(1) In northern Serbia, etc.: Lo, for Losnitza; Ma, for Malyen Ridg Se, for Semendria; U, for Uzhitze; Va, for Valyevo; Vi, for Vishegrad; Z, for Zaietchar L, for Leukovatz; Ve, for Veles; Vr, for Vranye. (3) Elsewhere: Du, for Durazzo (on th**

**d trenches of the Balkan Peninsula.**

**Mi, for Mitrovitza (on the Save); O, for Orsova; Ob, for Obrenovatz; S, for Shabatz; (2) Along the Morava-Vardar trench; D, for Demir Kapu gorge; Ku, for Kumanovo; Adriatic); I, for Ipek (42½° N. and 20° E.); K, for Katchanik (42¼° N. and 21° E.).**

or "corridors" runs southeastward from Belgrade on the Danube to Constantinople on the Bosporus and consists in large part of the valleys of the Morava and Maritza Rivers. The other connects Belgrade with the harbor of Saloniki on the Aegean Sea and is formed by the Morava and Vadar valleys. From Belgrade as far as Nish the Morava valley is common to both routes. Although possession of the Morava-Vardar trench incidentally became essential to the Teutonic powers for military and political reasons discussed below, it was primarily for control of the Morava-Maritza depression that the campaign was undertaken.

The Morava-Maritza trench in history

The full significance of the Morava-Maritza trench can be appreciated only in case we recall the important rôle it has always played in the history of the Nearer East. From all parts of Europe highways of travel converge southeastward toward the points where Occident and Orient touch hands at the Bosporus. Whether coming from the plains of the Po over the Pear Tree pass, from western and central Europe along the upper Danube, or from farther north through the Moravian and other gaps to the Vienna gateway, travelers find the mass of the Balkans blocking the path to Constantinople and the East; just as in other days the hosts which invaded Europe from the lands of Asia Minor found in this same barrier an impediment to progress toward the northwest. Under these conditions it was inevitable that a continuous river trench cutting clear through the barrier from the plains of Hungary to the shores of the Bosporus should become a topographic feature of commanding historical importance.

Roman military road

Long before the time of the Romans the Morava-Maritza valley had become a highway for peoples migrating east or west through the mountainous Balkan lands. In a later day one of the principal Roman military roads led from Belgrade through the trench to Constantinople. The great

Slavonic flood which issued from the plains of northeastern Europe through the Moravian and Vienna gateways entered the Morava valley and, in the seventh century of our era, was flowing through the trench to surge about the walls of Adrianople. A few centuries more, and the mountain sides were echoing the shouts of the Crusaders who toiled along the same pathway to fight for the Holy Sepulcher. Back through the same defile came those hordes of conquering Turks who pushed the limits of their misrule to the very gates of Vienna. In our day a double line of steel rails has succeeded trail and military road, and the smoke of the Orient Express hangs low in the very valley where, centuries ago, dust clouds were raised by the passing of Roman legions, Crusading knights, or Turkish infantry. Here is the vital link in the great Berlin-to-Bagdad railway route, the channel through which German ambition hopes to reach the Far East, and the path by which the Teutonic powers must send men and munitions to the hard-pressed Turks and bring back food to their own hungry people.

**Route of the Crusaders**

**Berlin to Bagdad railway**

Let us examine for a moment the physical characteristics of the stream-carved trench which has figured so prominently in the past history of southeastern Europe and which again has focused upon it the eyes of the civilized world. The mouth of the Morava valley is widely open to the plains of Hungary, where the Morava River unites with the Danube some miles east of Belgrade. Southward up the river the valley narrows gradually, and the hills on either side rise to mountainous proportions; but as far up as Nish it is mature, with a flat and sometimes marshy flood-plain over which the river flows in a complicated meandering course, with occasional oxbow lakes and braided channels. Only at two points, where the river has probably cut through ridges of exceptionally resistant rock, does the valley narrow to a more youthful form and force the better roads to make long

**Terrain of the Morava-Maritza trench**

**Morava valley**

detours over the hills. There is usually ample room for a main road on each side of the river, while the railway crosses from one bank to the other in order to connect with the larger towns located on the valley floor. The river is navigable half-way up to Nish, and throughout the entire distance the flood-plain soils yield rich harvests of maize and wheat.

**Nishava valley**

From Nish the route leads southeastward up a branch stream called the Nishava, to a low divide within Bulgarian territory. The valley of the Nishava is more youthful than that of the Morava and is so narrow in places that the wagon road twice abandons it for a course across the mountains. The railway is able to follow it throughout, however, and in one place the valley widens to a broad basin on the floor of which lies the important town of Pirot. Here fortresses crowned the adjacent hills to guard against a Bulgar invasion of Serbia along this comparatively easy path.

**Sofia basin**

After crossing the divide at Dragoman pass, about 2,500 feet above sea-level, both road and railway descend to the broad, fertile floor of the Sofia basin. Fortunately this trends northwest-southeast and is thus in line with the general course of the Morava-Maritza trench, although it drains to the northeast through a narrow outlet gorge into the Danube. At the southeastern end of the basin the low Vakarel pass, but little higher than the Dragoman, is crossed, and road and railway easily reach the much larger basin drained by the Maritza River and its tributaries.

**Maritza valley**

The Maritza takes a direct course toward Constantinople for more than 150 miles, then turns abruptly southward to the Mediterranean Sea. At this sudden bend in the river stands the fortified city of Adrianople. Except for a short distance below the city, the Maritza no longer serves as part of the great pathway to Constantinople, but becomes a segment in the natural moat, consisting of the

Tundja and lower Maritza valleys, which in the past repeatedly provided Constantinople with an admirable line of defense against aggression from the west. A Adrianople the river is too frequently obstructed with s bars to be of much use for navigation, but its broad b carries the road and railway which follow the southern l of the stream. South of Adrianople the small Ergene R flows to the Maritza from the east, and its valley offe very gentle grade which the railway ascends till within a miles of Constantinople.

Natural moat protecting Constantinople

### *The Morava-Vardar Trench*

Strategic value of the Morava-Vardar trench

Second in importance to the Morava-Maritza corridor the deep trench which cuts through the Balkans from no to south, connecting Belgrade with Saloniki. The Mora Vardar depression does not lead to the land bridge uniti Europe with Asia Minor, but it does serve as a most i portant outlet channel from the plains of Hungary to t Mediterranean Sea, and is one of the shortest routes fro central Europe to the Suez Canal. From southern Germa and the eastern Alps, the foothills of the Carpathians an the Alps of Transylvania, and from all of the great Hu garian basin, the valley routes lead straight to Belgrad whence the Morava-Vardar valley cleaves a way through th mountains to the open waters beyond.

Topographic key to Balkan history

It is not without reason that the Morava-Vardar trench ha been called the key to the history of the Balkan peninsula. Through it ebbed and flowed the tides of repeated invasions from the dawn of history. Under Roman dominion most of it was occupied by an important military road. Through it the Ostrogoths entered northern Greece in the fifth century, A.D., while names still found on the map of Greece bear witness to the great Slav flood which, two centuries later, flowed through the trench and overwhelmed the Greek peninsula. The story

*Central News.*

**Italian artillerymen dragging a giant howitzer up a steep mountain trail in the Alps.**

*Italian Official Photo.*

**One phase of mountain warfare. An engine driving rock drills used in excavating a tunnel under Mount Tofana. By means of this tunnel the Italians undermined and blew up an Austrian fortress on the mountain top.**

of the Serb race is largely the story of a struggle for control of this vital artery of communication. Austria's ambition to seize for her own uses a channel to the sea which should not open on the inclosed Adriatic has been the mainspring of her reactionary policy in Balkan affairs. Bulgaria, realizing that the nation which dominates the Morava-Vardar depression must ultimately dominate the politics of the peninsula, precipitated the second Balkan war in order to make good by force of arms her claim to a section of the trench; and the same incentive played an important part in determining Bulgaria's alliance with the Teutonic powers in the present conflict. Most of the friction between Greece and the Entente Allies had its inception in the fact that Greece controlled one section of a channel all of which was essential to the existence of Serbia. The Belgrade-Saloniki railway was the main artery of commerce which carried through the trench the life-blood of a nation.

**Austrian policy**

**Bulgarian ambitions**

The physical characteristics of the Morava valley as far south as Nish have already been discussed in connection with the Morava-Maritza trench. From Nish southward to Leskovatz, road and railway traverse one of the open intermontane basins which frequently occur in the midst of the Balkan ridges; but farther south the stream flows from a youthful gorge which continues up the river for ten or twenty miles before the valley again broadens out to a somewhat more mature form. Just north of Kumanovo lies the divide between the Morava and Vardar drainage, a low, inconspicuous water-parting some 1,500 feet above sea-level, located in the bottom of the continuous, through-going trench, and placing no serious difficulties in the way of railroad construction.

**Terrain of the Morava-Vardar trench**

South of Kumanovo the valley broadens into a triangular lowland, near the three corners of which stand Kumanovo, Üsküb, and Veles. The main Vardar River enters the lowland from the west, flowing out again at the south through

a narrow, winding valley which carries the railway, but no good wagon road. At Demir Kapu the valley narrows to an almost impassable gorge for a distance of several miles but soon broadens again to a flat-floored valley in which the river follows a braided and occasionally meandering channel to the sea. The lower course of the Vardar lies in a very broad, marshy plain terminating in the delta southwest of Saloniki. The special strategic importance of the triangular lowland near Üsküb and the Demir Kapu gorge will be emphasized later.

**Demir Kapu gorge**

While the Morava River is navigable for small boats from the mouth half-way up to Nish, the upper Vardar is too full of rapids and its lower course too full of sandbars to make river traffic practicable. The strategic value of the Morava-Vardar trench, like that of the Morava-Maritza, lies in the fact that, notwithstanding it occasionally narrows to gorge-like proportions, it gives an unbroken channel-way clear through a rugged mountain barrier.

### *Peaceable Conquest of the Maritza Valley*

**Morava-Maritza trench and German diplomacy**

The immediate object of the Balkan campaign of 1915 was to secure for Germany complete control of the Morava-Maritza trench and the Orient railway which runs through it from Belgrade to Constantinople. Roughly speaking, one-third of the trench was in Turkish territory, and therefore already subject to German supervision; one-third was in Bulgaria; and the remaining third in Serbia. German diplomacy set itself the task of inducing Bulgaria to become an ally of the Central Powers, in order that the middle third of the Morava-Maritza trench might pass under German control without a contest and in order, further, that Bulgarian troops might bear the brunt of the fighting necessary to capture the remaining third from Serbian hands.

This was truly an ambitious plan, but certain considerations having a geographic basis made it possible for Germany to crown the program with success, and that with slight cost and incalculable profit to herself. The close of the second Balkan war found Bulgaria not only bitter from the disastrous defeat with which her treachery to her allies had been punished, but suffering serious geographical disadvantages from the illogical boundaries forced upon her. Rumania's appropriation of the Dobrudja brought hostile territory close to Bulgaria's chief seaport of Varna and also menaced the safety of the railway connecting with the port, since this line lies parallel to the new boundary and close to the frontier. The natural outlet for all central Bulgaria is to the Mediterranean by way of the lower Maritza River; but the reconquest of Adrianople by the Turks led to a division of territory which forced Bulgarian goods enroute downstream to the Bulgarian port of Dedeagatch to cross through a small section of Turkey. The only other natural channel to the Mediterranean from Bulgarian lands was down the Struma valley to the port of Kavala; but Greece in her turn had insisted on a boundary which should leave the lower course of the river and the port in her hands, thus compelling Bulgarian commerce by this route to pass through Greek territory. Finally, Serbia obtained possession of that section of the Morava-Vardar trench which Bulgaria had coveted, leaving to the latter no part of the key to future power in the Balkans. The opening of the present war thus found Bulgaria with a serious geographical grievance against every one of her neighbors. With coast lines bordering on two seas, every bit of her commerce, save only that with Russia, was forced to pass through hostile lands.

**Geographic grievances of Bulgaria**

**Bulgaria's poor outlets**

Here was a fertile field for German diplomatic effort, and Bulgaria lent a willing ear to plans which promised immediate redress of past wrongs. Turkey was induced to

**A bargain in valleys**

return to Bulgaria the strip of land west of the lower Maritza, thereby insuring to her a railway connection to her Mediterranean port lying wholly within her own boundaries. As a further reward for direct action against Serbia, Bulgaria should receive the coveted section of the Morava-Vardar trench, the conquest of which would be rendered easy by Teutonic coöperation from the north. It was a bargain in valleys. In return for free use of the upper Maritza valley, and assistance in effecting the conquest of the Morava valley, Bulgaria was to receive a part of the lower Maritza valley and a section of the Vardar valley. German diplomacy won, the geographic bargain was made, and from that moment there remained only the problem of forcibly seizing the Morava-Vardar trench.

### *Natural Defenses of the Morava-Vardar Trench*

**Teutonic plan of campaign**

While conquest of the Morava valley and its continuation up the tributary Nishava was alone necessary to complete Teutonic possession of the Belgrade-Constantinople railway route, two considerations made a comprehensive campaign against the entire Morava-Vardar trench essential. In the first place, as we have just seen, the Vardar valley had to be secured for political reasons, since its possession by Bulgaria constituted an essential part of the Teuton-Bulgar bargain. But military reasons also required its capture. It constituted the one effective line of communication leading to the Serbian armies defending the northern frontier. To cut it was to deprive those armies of reinforcements, munitions, and other supplies coming from the south. Furthermore, possession of the Morava-Maritza trench would never be secure so long as Serbia and her allies held the Vardar depression, for at any moment they might launch a bolt along this natural groove which would sever the Orient rail-

way at Nish and thus undo all that had been accomplished through the new alliance with Bulgaria. For the Teuton-Bulgar forces the capture of the combined Morava and Vardar valleys was a single military problem. Let us examine the physiographic features which serve as natural defenses of this important trench.

**Natural defenses on the north**

The Morava valley is widely open to the north and is there bounded on both sides by comparatively low hills. An enemy securing a foothold in the rolling country to the east or west could enter from either of these directions as well as from the north, just as the Orient railway coming from Belgrade enters the valley from the west, twenty-five miles above its mouth. Hence an effective barrier against attack from the north must cover more than the actual breadth of the northern entrance to the valley. Such a barrier is provided by the natural moat of the Save and Danube Rivers which protects the entire northern frontier of Serbia; and by the hills south of the moat which, as one progresses southward, rise into a wild, mountainous highland.

**Valley of the Save**

The Save is a large river swinging in great meanders across a broad, marshy flood-plain. The extensive swamplands on either side of the river are difficult to traverse at any time, while the flood waters which spread over the lowland in spring and autumn often make the barrier quite impassable except at Mitrovitza (not to be confused with the Mitrovitza near the Kosovo Polye referred to farther on). South of Mitrovitza and west of Shabatz the marshy peninsula between the Drina and the Save is called the Matchva and is famous for its inhospitable character. In volume the Save is of sufficient size to constitute an obstacle against invasion, but for purposes of navigation it suffers from its overlong meandering course and from frequent shifting of channels and sandbars. At no point is the stream fordable, and at Belgrade alone is it crossed by a bridge.

**Marshes of the Matchva**

Valley of the Danube

The Danube is a river of imposing volume, in places from one to several miles wide. Its value as a defense against invasion is very great, notwithstanding that the numerous islands which mark its braided course from Belgrade east to the Iron Gate gorge offer some advantages for a crossing. It is unfordable and unbridged. East of the braided section the river exchanges its open valley for a narrow, winding gorge which cuts through a mountainous upland and reaches its most imposing aspect at the Iron Gate near Orsova. The walls of the gorge, sometimes forest-clad, sometimes bare rock, are exceedingly steep; while the mighty volume of water constricted within its narrower channel gives a river which is both swift and deep. To cross such a barrier in the face of enemy fire would severely test the abilities of the best-trained soldiery.

Iron Gate

Save-Danube barrier in history

It is not strange that so impressive a natural obstacle as the Save-Danube valley should have served for centuries as a bulwark against invasion of the Balkan peninsula from the north, nor that it should long have been the physical barrier separating the dominions of the Sultan from Austrian lands. In combination with the difficult hill country to the south, the great natural moat furnished the Serbians with an admirable defensive screen, in attempting to pierce which the Teutonic armies suffered more than one costly defeat.

Natural defenses on the east

Throughout its entire length the Morava-Vardar trench is protected on the east by a complex of mountain ridges representing the western ends of the Balkan and Rhodope masses and the southwestern extremity of the Transylvanian Alps. All of these ranges appear to have reached a mature stage of dissection in which the maximum degree of ruggedness is attained. A maze of steep-sided ridges and peaks rises from one to several thousand feet above the bottoms of narrow valleys, while at the north the mountain barrier is reinforced by the gorge of the lower Timok River and a short section

of the Danube valley. Much of this difficult country is forested, and no part of it could be crossed with ease by a hostile army.

Passes through the eastern barrier

There are, nevertheless, certain pathways through the eastern barrier which might be forced by a foe possessing superior numbers. Chief among these is that segment of the great Morava-Maritza trench carved by the Nishava River, which unfortunately rises within Bulgarian territory, and flows directly through the barrier into the Morava-Vardar trench at the critically important junction near Nish. To stop this gap the fortifications of Pirot just inside the Serbian border were constructed. Zaietchar, another fortified town farther north, guards the common entrance to the Tsrna and upper Timok valleys, through which hostile forces might ascend to passes whence the drop into the Morava valley is readily effected. The Vlasina, Kriva, and Bregalnitza Rivers, rising at or near the Serbo-Bulgarian boundary on the crest of the main range and flowing westward to the Morava and the Vardar, give access to the trench at Leskovatz basin, at Kumanovo, and in the Veles-Krivolak region. Finally, the broadly open Strumitza valley, mainly in Bulgarian territory, but heading close to the lower Vardar, affords access to several passes from which it is but a few hours' march to the Vardar trench either above or below the Demir Kapu gorge.

Vulnerable position of the Morava-Vardar trench

It appears, therefore, that despite the protection afforded by difficult mountainous country east of the Morava-Vardar line, the trench was open to attack at a number of critical points, provided the invading forces were sufficiently large to overwhelm resistance and drive their columns through the narrow valleys. This danger was the more acute because along much of the eastern frontier Bulgarian territory reaches the crest of the mountain barrier and in some places even beyond the crest to the western or Serbian slope. It

should be noted, furthermore, that the hostile territory flanks the Morava-Vardar trench throughout practically its entire length, usually lying not more than fifty miles distant, while near Vranye and just north of the Greek border westward protrusions of the Bulgarian frontier reduce the distance to a dozen miles or less. The largest and most vital artery carrying the life-blood of Serbia lay dangerously near the surface, and a single stab of the Bulgarian knife might prove fatal.

**Political conditions on the west**

West of the Morava-Vardar trench the threat of danger was less imminent, and the natural protective screen more effective. Although Bosnia and Herzegovina were in Austrian hands, the people were more or less hostile to their new rulers and favorably disposed toward the Serbs. Montenegro was Serbia's ally, while uncertain Albania was not an important factor in any event. Across the Adriatic lay Italy, another ally of Serbia. Only at the north, then, was there danger of an attack upon the Morava-Vardar line from the west; while farther south succor from friends, rather than attacks from enemies, was to be expected from the direction of the Adriatic.

**Natural defenses on the west**

The broad belt of mountains lying between the Morava-Vardar depression and the Adriatic shore is one of the most imposing topographic barriers in Europe. From the earliest times it has stood as an almost impassable wall cutting off the people of central Serbia from all effective intercourse with the inhabitants of the Italian peninsula. In the Middle Ages, Ragusa and other Slavonic cities on the Adriatic coast, although part of a Serbian province and the home of a flourishing school of Serbian literature, found communication with the interior so difficult and with Italy so easy that they came under Venetian instead of Serbian control. The same mountain wall which so long prevented extension of Serbian power westward to the sea, likewise served for

centuries as an effective barrier against the eastward migration of western European civilization into the dominion of the Turks. To the present day no railroad has crossed the barrier to unite the great valley of central Serbia with the sea.

The mountainous terrain in history

Included in the mountainous belt are ranges high enough to carry snow caps until the month of August, and the name "Albania" is believed by some to have its origin in the snowy appearance of that wild region. It is said that the "Accursed mountains" of northern Albania and eastern Montenegro include some of the least explored lands of all Europe. Just as the mountains of Wales and the Highlands of Scotland preserve languages and customs which have been driven from the open country of England, so the fastnesses of the Albanian hills have kept alive a difficult language that is older than classical Greek and customs which render the rude inhabitants of the country a picturesque subject for study. The conquering arm of the Turk reduced the Bulgarian inhabitants of open plains to complete subjection within a comparatively short time; but a century and a quarter was required to secure a less firm hold upon the mountainous lands of Serbia, while the inaccessible wilds of Albania and Montenegro were never completely subjected to Turkish power. Montenegro was the last Serbian stronghold to yield to Turkish supremacy and the first to regain complete independence.

Parallel ridges and valleys

The physical characteristics of a belt of country so difficult to traverse deserve a word of further description. In the north the mountains consist of much eroded earth folds of the Appalachian type, trending northwest-southeast parallel to the northern Adriatic coast and rising from 5,000 to 8,000 feet above sea-level in the higher ranges. Between the hard rock ridges streams have excavated parallel valleys on the weaker beds, but these valleys are of little real service

to man since they lie at right angles to the natural course of his movements between coast and interior. Farther south the rock structure is more complex, and the mountain ridges produced by erosion accordingly of more complicated pattern.

**Karst topography**

Among the rocks involved in the mountain building, limestone is a conspicuous element, and its soluble nature has imposed a peculiarly forbidding aspect on the topography. Most of the rainfall passes underground through sink-holes and smaller solution cavities and then finds its way through subterranean channels to a few principal rivers, lakes, or the sea. As a consequence much of the mountain country is dry and barren, springs are far apart, and the open water courses difficult of access because deeply intrenched in rock-walled gorges. The "gaunt, naked rocks of the cruel karst country" are not only themselves of little value to mankind but they render inaccessible and therefore comparatively useless many excellent harbors on the east coast of the Adriatic.

**Intermont basins**

Because the limestones are purer and more abundant along the coastal border we find that the karst topography is there best developed. Farther inland the maze of hills is occasionally broken by an intermontane basin, the center of whose broad floor may be covered by marsh land, while throughout its remaining portion the fertile soils derived from impure limestone and other rocks yield good returns to the cultivator. Among the largest of the basins are those in which Monastir and Ipek are located; the Tetovo basin, west of Üsküb, where an important branch of the Vardar River takes its rise; and the famous Kosovo Polye, or Plain of the Blackbirds, southeast of Mitrovitza, where in its last great effort against the advancing Turk the Serbian army suffered defeat in 1389. It is largely to these areas that one must credit such measure of prosperity as is vouchsafed the dwellers of this western mountain barrier; but absence of

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Serbian troops crossing the Kolubara River barrier on the ruins of a bridge which was repeatedly destroyed and repaired during the fighting along this stream.

*Central News.*

A barren basin or "polye" in the Serbian mountains. The bad road has caused the cart to upset, with resulting injury to the driver.

connecting lowlands makes the basins of small service in expediting travel across the region.

Transverse gorges

It is true that certain rivers cut through the mountain ranges to reach the sea; but not one of these has carved a valley suitable to serve as a highway between the coast and the central Morava-Vardar trench. For the most part the cross valleys are narrow and deep and bounded by the steep, rocky walls characteristic of young gorges cut in limestone. Falls and rapids are frequent, and the headwaters usually end in a maze of ridges some distance west of the central depression. The valley of the Narenta carries a narrow-gauge railway through the mountains of Bosnia and Herzegovina to a pass, across which Sarayevo and the valley of the Save are accessible; but the only branch line running east to the Serbian border terminates in the vicinity of Vishegrad, while the nearest railway terminus of the Serbian system is more than twenty miles across the mountains at Uzhitze at the head of the Western Morava valley. Through the gorge of the middle Narenta the course of the railway is difficult, and the crossing of the pass is made possible only by using a rack-and-pinion arrangement, which indicates the unsatisfactory character of the route for commercial purposes. The next river of importance to the south is the Drin, which reaches the sea near Scutari; but it flows in a gorge so wild and deep that the poor trails of the district often leave it for a course across the barren hills. When a column of Serbian troops successfully negotiated this defile during the first Balkan war, the feat was hailed as a great military accomplishment. The Shkumbi valley offers an entrance from Durazzo to the rail-end at Monastir, but traffic by this route must cross three mountain passes. A famous Roman road, the Via Egnatia, followed this valley; and the only other two important roads to cross the barrier in Roman times had their locations determined by the Narenta and

Narenta gorge

Gorge of the Drin

Shkumbi valley

the Drin, although in each case the stream gorge was abandoned in places for a more feasible course over the uplands. Of these former roads little remains today except rugged mule paths. From the standpoint of military geography the broad mountain belt west of the Morava-Vardar trench is practically impassable.

There are within this western mountain belt three depressions which have relatively little value as part of cross-routes to the sea, but which we must keep in mind if we are fully to understand certain aspects of the campaign against Serbia. First among these is the open Kolubara valley, at the head of which stands the town of Valyevo. A small railway of some military value traverses the valley and connects the town with the Save River. Directly south across the Malyen ridge, the Western Morava valley heads near Uzhitze and runs east to join the main trench. The Western Morava River is a mature stream meandering on a flat flood-plain of considerable breadth and is bordered by a narrow-gauge railway connecting Uzhitze with the Orient Express line. Finally, the Kosovo Polye, already mentioned, forms part of a subsidiary trench parallel to the main Morava depression. Northwestward the basin is replaced by the long, narrow, winding gorge of the Ibar River, which unites with the Western Morava, but which is not followed throughout its length by so much as a good wagon road. To the southeast the basin is drained by the Lepenatz River, which flows through a narrow outlet gorge at Katchanik, the so-called Katchanik pass, to unite with the Vardar at Üsküb. An important railway leaves the Nish-Saloniki line at Üsküb and runs through the Katchanik gorge and Kosovo Polye to Mitrovitza on the Ibar.

**Kolubara valley**

**Western Morava**

**Ibar valley**

**Katchanik pass**

Our examination of the surface features of the region under discussion has developed the fact that the Morava-Vardar trench is well protected against invasion, whether

from the north, the east, or the west; but it appears that the most effective protective barrier is on the west, where it is least required and where, indeed, it might shut off much needed succor from Italy in a time of peril. Let us now trace the history of the campaign against Serbia in the light of our knowledge of the topography.

## CHAPTER XIV

## CAMPAIGNS AGAINST SERBIA

### *Early Campaigns for the Morava-Vardar Trench*

**First blow of the world war**

AUSTRIA'S first attacks against the northern barrier formed by the Save-Danube moat and the rising hills to the south were ostensibly made primarily for the purpose of punishing Serbia, while the idea of securing a portion of the Morava-Vardar trench was kept in the background. The first blow in the world war was struck in the last days of July, 1914, when Austria launched a strong offensive along the entire Save-Danube line. The Serbians destroyed the great bridge over the Save at Belgrade in order to make the barrier more secure and assailed with vigor every enemy column which endeavored to cross the river by boats or pontoon bridges.

**First attempts to cross the Save-Danube barrier**

For nearly two weeks the Austrians made repeated attempts at seven different points to reach the south bank and at the same time attacked the line of the Drina near Losnitza and Vishegrad. At Belgrade a crossing in the shelter of the ruined bridge was only temporarily successful. Farther east, at Semendria, an island served as the base for crossing on a pontoon bridge where the channel narrowed to 200 yards; but the invaders were first held in check, then thrown back in defeat. All attempts to cross at Obrenovatz, southwest of Belgrade, failed. Far to the west Austrian troops succeeded in forcing a passage at Mitrovitza and for some days held their ground in the marshes on the south side of the stream; while the Drina was crossed at Vishegrad. Even here the success seems to have been partial and tem-

porary, for Vishegrad was retaken by the Serbs August 7th, and on the 10th the Serbian government reported the expulsion of the last Austrian from Serb territory. The first attempt to force the northern barrier had ended in failure.

Second attempt

A second attempt was made immediately. After a furious bombardment of the Save-Danube line superior Austrian forces crossed the Save at Shabatz and the Drina at Losnitza, while columns attempting to cross at Belgrade were defeated. In the gorge of the Iron Gate at Orsova, where the swift current and steep walls made the attempt peculiarly hazardous, it is said that three Austrian regiments were destroyed while trying to cross by a pontoon bridge. Renewed attempts to cross at Belgrade and Semendria were frustrated.

Natural defenses of Belgrade

Belgrade stands on the point of a peninsula projecting into Hungarian territory and is subject to attack from three sides. It was the capital of Serbia, and its capture was urgently desired for political as well as strategic reasons. That this important outpost at the very door of the enemy's country, attacked by superior numbers and bombarded by superior artillery, should have resisted capture for four months, is a striking proof of the strategic importance of such barriers as the Save and Danube Rivers. Meanwhile, on August 20th the Austrian armies which had entered northwestern Serbia were overwhelmed with defeat after a four-day battle in the foothills east of Losnitza and in the marshes of the Matchva near Shabatz and were driven back across the Drina with heavy losses. Fleeing remnants of the invading force overcrowded the few bridges spanning the unfordable stream and large numbers perished by drowning. A second attack against the natural defenses of northern Serbia had proven futile.

Third attempt

About the end of the first week in November, 1914, Austro-Hungarian armies more than 300,000 strong launched a third attempt to force the northern barrier. The open valley of

the lower Drina and the marshy Save River were crossed by superior forces with the aid of heavy artillery. Advancing up the Kolubara valley and the low foothills on either side as far as Valyevo the Austrian center prepared to attack the Serbian position on Malyen ridge, while the left wing occupied Belgrade, and the right wing captured Uzhitze. Apparently the plan of campaign was for the Austrian center and right wing to converge upon the head of the Western Morava valley and then follow down that depression into the main Morava-Vardar trench, thus outflanking the forces defending its northern end. Meanwhile the small Serbian army was giving a good account of itself, defending river and marsh and hill slope with such effect that not until the first of December did the Austrian forces reach the Uzhitze-Valyevo-Belgrade line. A month of desperate fighting with heavy losses had elapsed before the invaders were ready to attack the main Serbian defensive position on Malyen ridge just south of Valyevo.

**Serbian victory of Malyen ridge**

Then came the stroke which startled the world. Assuming the offensive and sweeping down the slopes of the Malyen, the Serbian veterans overwhelmed the whole Austrian army with disaster. Valyevo was recaptured, Belgrade and Uzhitze cleared of the enemy, and all northwestern Serbia swept clean, except the marshy peninsula between Shabatz and the Drina, where Austrian troops maintained a foothold with the aid of topography especially favorable for defense. The upper Drina was crossed by the victorious Serbs, and Sarayevo seriously threatened. A badly beaten Austrian army retired to Austrian soil, to have its commander officially disgraced for the crime of failure. Whether because of difficulty in bringing adequate supplies across the marshy Save and over the foothills to the Austrian front, or because the Austrian forces had been unduly weakened in their month's campaign against the Serb defenses, or because the difficulties

of the Malyen position were underestimated and troops were detached to serve elsewhere, a third attempt to force the natural protective barriers of northern Serbia had ended in a costly defeat for the Teutons.

Austria's inability to force the difficult terrain

It was now evident that Austria, with many of her troops engaged on other fronts, could not assemble forces competent to dislodge the Serbians from their favorable defensive position. At the same time the need of controlling the Morava-Vardar trench was increasing. The Central Powers were besieged by the Allies, and an outlet to neutral lands and to the sea was a pressing necessity. The Turks needed munitions and the Central Powers needed food. A successful campaign was also required to wipe out the disgrace of past defeats at Serbian hands and to impress wavering neutrals with Teutonic military prowess. Hence was initiated the diplomatic campaign already described, which culminated in the peaceable conquest of the Maritza valley and the accession of Bulgarian troops to the ranks of the Central Powers. Conditions were now ripe for a combined Teuton-Bulgar campaign designed to conquer the entire Morava-Vardar trench.

German and Bulgarian aid

### *The Conquest of Serbia*

Serbian plan of defense

Early October, 1915, found some 200,000 Germans and Austrians massed on the Save-Danube line, while a larger number of Bulgars were concentrating in the mountains along the eastern border. The main Serbian army stood behind the northern defensive line to meet the Austro-German attack, smaller forces alone being detailed for operations on the east. A Bulgarian offensive was to be met by the Greek army acting in concert with an Anglo-French Expeditionary Force. At the last moment the whole scheme of Serbian defense was shattered by King Constantine, who repudiated

Greece's treaty with Serbia and refused the promised support of his army. The entire length of the Morava-Vardar trench was thus thrown open to flank attacks from the east while the main Serb armies were trying to protect the northern entrance.

**Crossing the river barrier**

On October 6th the Austro-German assault was launched. Heavy artillery fire, which the Serbians could not match, protected the columns attempting to force a passage across the river barrier. Nevertheless, the crossing was a costly undertaking; many of the invaders were driven back to the north bank or caught on the south side and annihilated, before large forces after two or three days' hard fighting securely established themselves on the southern bank. It is interesting to note that the principal crossings were effected above Belgrade, below Belgrade, at Semendria, Ram, and Gradishte,—all five of them points close to the northern entrance of the Morava valley, all of them except the last located at the ends of Hungarian railways capable of bringing supplies directly to the points of crossing, and all of them near sandbar islands in the river which were utilized to good advantage in several and possibly in all cases. There also was heavy cannonading at Orsova, the only other railhead on the Danube frontier; but no crossing of the difficult gorge near the Iron Gate seems to have been made until later, possibly after threat of envelopment caused withdrawal of the main body of defenders from the northeast corner of Serbia. When the crossing was effected it was with the aid of an island in the river below the town.

**Slow Teuton advance in hill country**

After the Danube barrier had been forced, the southward progress of the Teutonic armies was remarkably slow. For six weeks the average rate of advance was about one mile a day. Despite their enormous superiority in big guns, it cost the Austro-Germans much time and the loss of many men to drive the Serbs from successive defensive positions

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A Serbian convoy retreating through a narrow section of the Morava valley north of Nish.

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A portion of the Austrian army halted on the north side of the Save River barrier. Temporary military bridges are seen in the distance.

in the hills. More than two weeks elapsed before the Danube was freed from the Serbian menace and so rendered available for boat transport of munitions to Bulgaria and Turkey. Austrian forces crossing the Drina near Vishegrad, the only rail-end on the northwestern frontier, found themselves unable to dislodge the Serbs from their mountain fastnesses, and after ten days' fighting had made no progress toward the head of the Western Morava valley.

### *The Bulgarian Attack*

Flank attack on Morava-Vardar trench

Meanwhile Bulgarian armies poured through gaps in the eastern mountain barrier and descended tributary valleys to the Morava-Vardar trench. One column descended the Vlasnia valley to the Leskovatz basin, another reached Kumanova and Üsküb by the Kriva depression, while a third descended the Bregalnitza to Veles. Vranye, Kumanovo, Üsküb, and Veles, defended by inadequate Serbian forces, were captured within less than two weeks, and the vital artery of Serbia cut in four places. Few could doubt but that these wounds would prove fatal.

Conquest of the Morava-Maritza trench

Farther north one Bulgarian army was attacking the fortifications of Pirot in order to open a way down the Nishava valley to Nish, while other forces had captured Zaietchar and were trying to push up the Tsrna and the upper Timok to reach the Morava trench above and below Nish. Progress in this field was much slower than farther south, however, and the Serbs maintained themselves in the mountainous northeast corner of their country until the fall of Pirot and Nish developed the danger that Bulgarians pushing north down the Morava and Austro-Germans advancing up the valley to meet them might close the neck of the salient northeast of the trench and capture the forces fighting there. Under pressure of this threat the Serbs withdrew to the

southwest; and about November 13, or more than a month after the campaign opened, the entire Morava-Maritza trench was in the hands of the Central Powers, and the reconstruction of the Orient railway could be prosecuted. The Morava-Vardar trench as far south as Veles was also in their control, and there remained only the problem of rendering the tenure of both trenches secure by pushing the Serbian and Franco-British forces west to the Adriatic and south to the Aegean.

**Disastrous results of Bulgarian occupation of Morava-Vardar trench**

The disastrous results of the Bulgarian occupation of the Morava-Vardar trench now began to be more manifest. Munitions and other supplies for the Serbian armies in the north were becoming exhausted, and the one artery along which they could freely flow had been severed. The quantities which could reach the Serbian front over rough mountain trails were utterly inadequate. Reinforcements were sadly needed; but the one railway leading north from the Anglo-French base at Saloniki followed the Morava-Vardar trench, and so was in the hands of the enemy, while the rough mule paths over the western mountain barrier could bring neither troops nor supplies from Italy. Had the broad belt of mountain and karst intervened between the Morava-Vardar trench and the Bulgarian frontier, and had the more open valleys of the east but led westward to the Adriatic, the history of the Balkan campaign would have been very different.

### *The Battle for Katchanik Pass*

**Serbian retreat to the higher mountains**

It was supposed that when the Austro-German forces reached the higher mountainous region bordering the Western Morava valley and it became difficult if not impossible to bring up their heavy guns, the rate of advance would become even slower than before. The fact that the advance was actually accelerated has been interpreted to mean that the

failure of Serbian supplies weakened the defense more than the unfavorable local topography injured the plans of the offensive. The Teutons moved rapidly across the Western Morava, and the Serbian army took up a position running eastward along the mountain crests south of the valley, then southward along the ridge west of the Morava-Vardar trench, and southwestward across the Katchanik gorge. It will immediately appear that the Katchanik position was the strategic key to this entire battle front. In the rear of the Serbian armies facing north and east, runs the straight subsidiary trench formed by the Lepenatz valley, Kosovo Polye, and the Ibar valley. The gateway to this trench is the narrow Katchanik gorge. A railway from Üsküb runs through the gorge to Mitrovitza at the north end of the Kosovo Polye, thereby more than doubling the strategic value of the depression. If the Bulgarian forces already in possession of Üsküb should succeed in breaking through the Katchanik gorge into the plain of Kosovo, they could strike north and east against the rear of the Serbian armies and convert retreat into disaster. Little wonder, then, that the "Katchanik pass" figured so prominently in the war despatches during this period!

**Katchanik pass as a strategic key**

But if Katchanik was the key to the Serbian position, Veles was the key to Katchanik. Should the Anglo-French troops coming up the Vardar from Saloniki capture Veles and debouch into the triangular lowland to the north, they would take in the rear the Bulgarian army trying to break through the Katchanik position. It would not be necessary for the Anglo-French force to enter the Lepenatz valley; the mere threat of inclosing the Bulgarians in the valley between the Serbs up at Katchanik and their allies down at the valley mouth would be sufficient to bring the Bulgars out of the trap in order to fight on the lowland, where, if defeated, they could retire northeastward into a region fully

**Strategic value of the Veles basin**

under their control. The threat would become imminent the moment Veles fell to the Allies. Such were the topographic relations responsible for the rather striking fact that an Anglo-French attack upon Veles relieved the pressure upon Serbian forces in the mountains far to the north.

**Serbs retire to Ipek and Monastir basins**

The strategic value of Veles was fully appreciated by the Bulgarian commanders, and heavy reinforcements were evidently poured into the Vardar trench at that point. All efforts of the Allied armies failed to achieve their purpose; Veles remained in Bulgarian hands and Bulgarian attacks on the poorly equipped Serbs defending Katchanik gorge proceeded without serious interruption. When it became apparent that the Katchanik position could not long be held, the Serbian armies at the north and east fell back toward the Ipek basin, while those farther south retired on the Monastir basin. All danger to the Teutonic occupation of the Morava-Vardar trench north of Veles was thus removed, and the remainder of the campaign consisted in squeezing the remnants of the shattered Serb forces and their Montenegrin allies westward through Albania and southward through Montenegro to the sea; and in driving the Anglo-French army and the Serbs near Monastir back upon the Saloniki defenses. The first of these movements progressed with exceeding slowness because of the difficult character of the country; and the terrors of the Serbian retreat over rugged mule paths and through wild mountain gorges in the cold and snow of winter can scarcely be imagined. But from the standpoint of strategic geography the second movement alone merits special consideration.

**The winter retreat through the desolate karst**

### *The Armed Camp on the Tsrna*

**Terrain of the Tsrna triangle**

When the French and English pushed up the Vardar valley toward Veles they seized as their base for a great armed camp the triangle of mountainous ground lying be-

tween the Vardar River and one of its tributaries known as the Tsrna, the latter a stream which must not be confused with the river of same name emptying into the Timok in northeastern Serbia. The position had certain topographic advantages which enabled it to be held for a long time in the face of superior forces; but suffered from one serious disadvantage which ultimately compelled its evacuation. Both the mountain ridges and the river trenches afforded admirable natural defenses. The gorge of the Tsrna is steep-sided and the stream unfordable. The only practicable bridge, a few miles above the river's mouth, was destroyed by the French after they had failed in an effort to move westward and join the Serbs, who were fighting at Babuna pass to prevent the Bulgars from getting into Monastir basin. For defensive purposes the larger Vardar River, protecting the east side of the triangle, was strategically important, because it is both wide and unfordable and its valley is steep-sided,—in one place a veritable gorge.

**Babuna pass**

But it is in the Vardar valley that the chief disadvantages of the situation become apparent. All munitions and other supplies, as well as all reinforcements for the armed camp, had to come from Saloniki over the single-track railway running up the Vardar trench. The railway lies close to the river all the way and for several miles is actually on its eastern bank, or outside the triangle. Its position was thus dangerously vulnerable, and its vulnerability was peculiarly aggravated by the fact that in the Demir Kapu gorge, the Iron Gate of the Vardar, the line is squeezed in between the base of high cliffs and the swiftly flowing river, crosses the river on a bridge at one point, and passes through a tunnel at another. If the Bulgarians, attacking the sides of the triangle, should destroy bridge, tunnel, or narrow road-bed in the gorge, the forces within the triangle would be caught in a trap. Hence it was that when the dispersal of the Serb

**Vulnerable points in the triangle**

**Demir Kapu gorge**

armies to the northwest had so far progressed as to free additional Austro-German and Bulgarian troops for action against the Allied armies at the south, the evacuation of the triangle was considered imperative.

**Strength of the Vardar and Tsrna barriers**

It has been estimated that at this time the forces of the Central Powers in the south probably outnumbered those of the Allies in the proportion of three to one, or even four to one. That the triangle should have been held so long in the face of greatly superior numbers bears eloquent testimony to the strength of the natural topographic barriers formed by the Tsrna and Vardar Rivers, as well as to the efficiency of the French who mainly were responsible for its defense.

**The Allied positions**

The British line now ran eastward from near the Demir Kapu gorge, along the ridge north of Lake Doiran and south of the Strumitza valley and, like the French triangle, was supplied by one single-track railway. The Serbian front in the Monastir basin ran from west to east just north of the town and connected with the French along the Tsrna River side of the triangle. It also was dependent for supplies upon a single railway line. The French triangle was thus a prominent salient projecting far beyond the general Allied front; it possessed a vulnerable point, the Demir Kapu gorge, on the east side of the salient; and it was the center of a line the two wings of which were less effectively protected by natural barriers and all of which was inadequately supplied with lines of communication.

**French withdraw from the triangle**

Early in December the withdrawal from this dangerous situation began. The French retired from the triangle and blocked the gorge against pursuit by blowing up the tunnel and bridge. The British were forced back toward the southwest by a series of furious Bulgarian assaults, and the Serbs were compelled to withdraw southward into Greek territory. The retirement was completed when the Allied armies fell back on the natural defenses of Saloniki. The great armed

General Sarrail surveying the Vardar trench near Krivolak, north of the Demir Kapu gorge.

French camp in the broad valley of the Vardar River south of the Demir Kapu gorge.

camp based on this important port was securely protected by two lines of physical barriers, either of which could have been rendered practically impregnable. Inasmuch as this camp was to harbor a mighty army for years instead of weeks, and inasmuch as the failure of the Teutonic allies to attempt the task of driving the armies of Sarrail into the sea was probably dictated more by a knowledge of the formidable nature of the natural defenses than by any respect for the sham neutrality of the pro-German Constantine, we may profitably trace the two defensive lines and note what topographic obstacles they presented to a Teutonic offensive.

### *Natural Defenses of Saloniki*

Outer line of topographic barriers

The outer line begins west of Saloniki on the marshy delta of the Vardar River, and follows up that unfordable stream for a distance of forty-five miles to Amatovo Lake. This part of the river's course is a network of braided channels between changing sandbars, and in places the flood-plain is marshy. From the southern end of Amatovo Lake to the northern end of Ardjan Lake is a stretch of twenty miles where the barrier consists of the Vardar River and the parallel lakes with intervening stretches of marsh land. Rivers, lakes, and marshes continue the formidable natural moat northward, eastward, and southeastward, with only one insignificant break, all the way to the Mediterranean at the Gulf of Orfano. The Ayak River, Lake Doiran, Kodja Su and Butkovo Rivers, Butkovo Lake, Struma River, Tahinos Lake, and its short outlet river, together with the marshy shores of the lakes and marshy flood-plains of parts of the rivers, serve to make the long curving trench an imposing obstacle. The difficulty of the terrain is enormously enhanced by the fact that just inside this trench, and forming its southern rim, is a curving ridge of high hills, the Krusha

Rivers, lakes, and marshes

Balkan and Beshik Mountains. From the sea to the Vardar valley these hills offer admirable artillery positions which absolutely dominate the valley trench and all places where a crossing of rivers, marshes, or lakes might be attempted. The northern slope of the hills, toward the enemy, is steep and forbidding; the gentle back slope toward Saloniki is easily ascended so that the defending forces could manœuver to advantage. Along the Vardar above the worst marshes and below the first lakes is perhaps the most vulnerable part of this line from the standpoint of the topography; but fortunately this is the part best supplied with railway and road communications with the base at Saloniki.

Dominating mountains

Within the outer line just described is one much shorter, consisting of the east-west trench containing Langaza and Beshik Lakes, and the connecting rivers and marshes, and extending from near the Gulf of Saloniki to the Gulf of Orfano. Like the former trench, this one also is dominated from the south by a long ridge of hills. The lake shores are marshy, and the only practicable passageway through the barrier, between the two lakes, is commanded by the artillery positions on an isolated mountain just south, which guards the gateway like an impregnable castle. Farther west hill country intervenes between the marshy shores of the Gulf of Saloniki and Langaza Lake, and intrenched positions here would be fully protected by the guns of the Allied fleets lying in the gulf. To afford adequate protection for the city of Saloniki the line would need to be prolonged westward to meet the Vardar River.

Inner line of topographic barriers

The strength of these natural positions is too obvious to require any special emphasis. Behind such barriers so great an army as was here assembled could withstand the best that the Kaiser and his allies could send against them. The western arc of the outer perimeter was not seriously threatened, and the Entente forces were not required to retreat

Figure 17. Natural defenses of the armed camp of Saloniki.

within the inclosure in this sector. But around Lake Doiran the fighting was bitter, and farther southeast the Allied armies took refuge for a time on the southern side of the Struma trench. The most important service, however, rendered by the natural defenses of Saloniki to the Entente cause was in forcing the Kaiser to close the Balkan campaign near the border of Greece instead of on the shores of the Mediterranean. The Teutonic armies might with impunity defy the ostensible neutrality of Greece and capture such Greek cities and fortifications as they chose; but the barriers of Nature, when fortified by a great army, they could not defy.

## CHAPTER XV

## THE RUMANIAN THEATER OF WAR

Rumania's strategic geographical position

WHEN in the summer of 1916 Rumania abandoned a position of wavering neutrality and cast in her lot with that of the Entente Allies, the hopes of the Allied powers rose to high levels. Justification for these hopes lay not so much in the fact that Rumania possessed an army reputed to be better trained than that of any other Balkan state, but rather in the advantageous geographic position which the new ally enjoyed. Her two provinces of Wallachia and Moldavia lay like the jaws of an open nutcracker, between which Hungarian Transylvania could be crushed as in a vise. Her peculiar outline added some 800 miles to the length of a battle line already too long for the declining man power of the Teutonic allies. Her western border lay but forty miles northeast of the Morava-Maritza trench, carrying the Orient railway, that vital artery which alone assured continued life to the Turkish Empire. Her oil fields and her wheat fields were added to the material resources of the Entente and closed to their sorely beset enemies. Small wonder that Rumania's decision was hailed with delight by the Entente powers.

The Allies' failure

A few months later all their high hopes lay in the dust. The Wallachian jaw of the nutcracker had been rudely wrenched away. Rumania, not Transylvania, had been crushed. Eight hundred miles of new battle front had been shortened to less than 300 miles. The Orient railway was still carrying munitions to the Turks. Oil fields and wheat

fields were supplying Teutonic conquerors, and the German Chancellor was grandiloquently offering terms of peace to his disappointed foes.

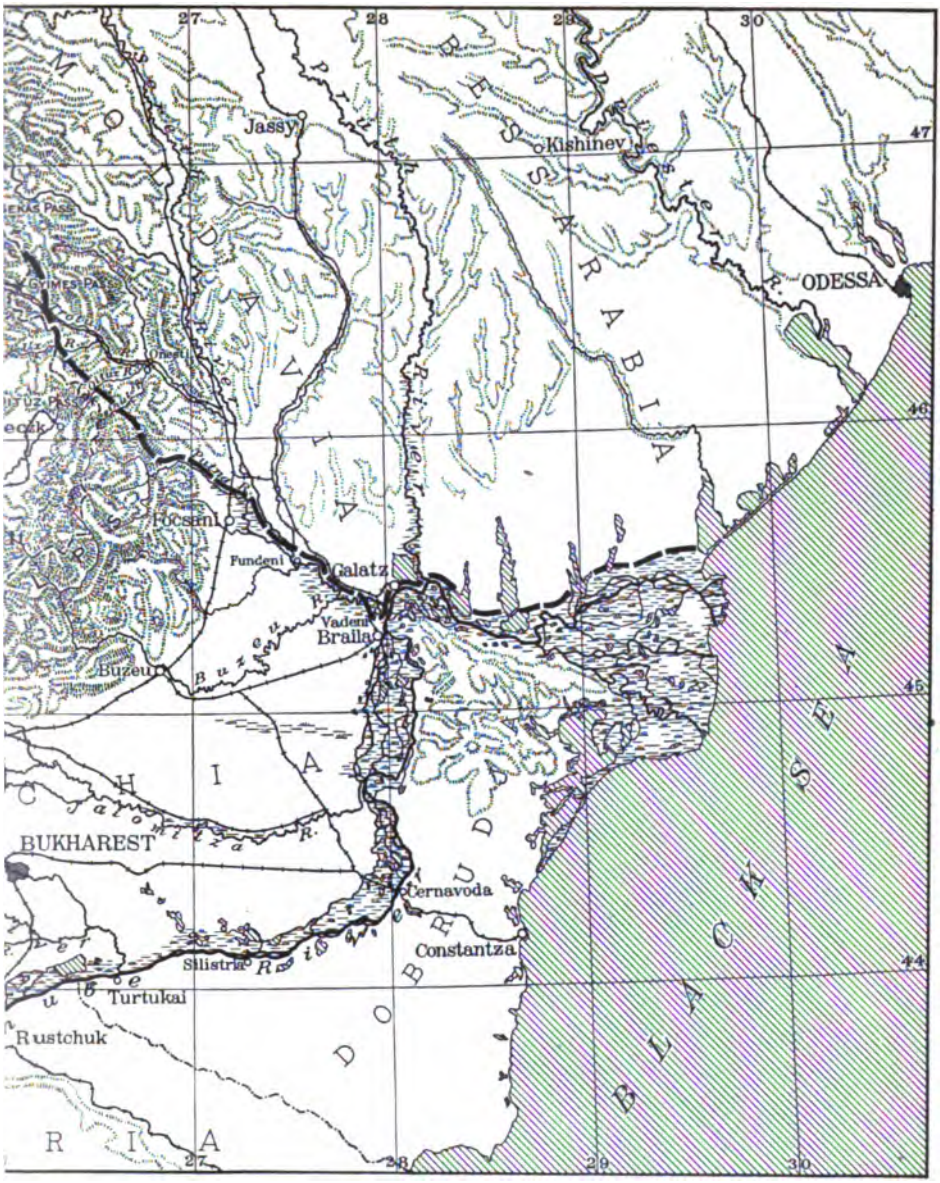
**Unexpected character of the Rumanian campaign**

The Rumanian campaign was disconcerting not alone to those most vitally interested in its consequences. The unexpected happened with such regularity that disinterested onlookers found ample need to revise their most confident predictions. More than one military expert would gladly delete whole paragraphs from his published discussions of the campaign and forget prophecies which events failed to justify. From the writings of one such unfortunate there would have to be erased the assurance that the only danger to Bukharest was from the east through an attack from Dobrudja; that no serious attempt would be made to invade Wallachia by way of the passes of the Transylvanian Alps; later, that the Buzeu River was the main defensive line to which the Rumanians were retiring; still later, that this main line was the Sereth-Trotus valley; and finally, that the Sereth-Putna barrier (which proved to be the impassable obstacle to pursuit) was not adapted for defensive purposes.

**Objects of this study**

The key to the Rumanian puzzle is in part geographical, in part political. In the following pages it will be our purpose, first, to analyze the geographic elements of Rumania's surface configuration and strategic position; second, to determine what plans of campaign were dictated by her geography and how far these plans were modified by political considerations; and, third, to trace the effect of land forms upon the detailed movements of armies throughout the campaign. If in the course of this analysis we find a logical explanation for the unexpected and disappointing events in Rumania, our first aim will have been achieved. If, further, we gain therefrom a knowledge of Rumanian military geography which will enable us to interpret future movements in this area, our study will have proved doubly profitable.

**Figure 18. Map showing the chief natural defensive barriers of Rumania. The heavy br**
**Sereth-Putna barrier at the close of**




roken line indicates the approximate position of the Russo-Rumanian front back of the
of the campaign, February, 1917.

### *The Natural Defenses of Rumania*

Few countries are so richly supplied with natural protective barriers as is Rumania. The entire eastern border is shielded by the Pruth River and the Black Sea, the northern and western by the Transylvanian Alps, the southern by the broad marshes of the Danube. Only in the southeast, for a distance of about 100 miles, is there a dangerous gap in the defensive line, the southern border of the province of Dobrudja. Those portions of the border of interest in the present connection are the Transylvanian Alps, the Danube valley, and the unprotected Dobrudja gateway. **Military frontiers**

From the border of Bukovina to the Iron Gates of the Danube the Transylvanian Alps form an unbroken mountain barrier, protecting the low Rumanian plain on the east and south from hostile invasion. They are a direct continuation of the Carpathian Mountains on the north and beyond the Danube connect with the western end of the Balkan range. Northwestward the mountainous topography is continued by the Hargitta and Bihar masses of Hungary, but in Wallachia and Moldavia the Transylvanian Alps drop down to low foothills, which are in turn bordered by the broad plain, sloping southward or eastward to the Danube. They have an average breadth of some fifty miles or more and usually consist of a main range, bordered on the Rumanian side by secondary ridges or hills, sometimes with a lowland intervening between the two. In the Moldavian sector the secondary crests consist of parallel ridges much like those of the northern Carpathians, and remind an American of the genetically similar Appalachian ranges. It is clear that an invader who succeeded in passing the main range would still have hard fighting before him if he would pierce the secondary defensive barrier and reach the plain beyond. **Transylvanian Alps**

**Nature of the mountain terrain**

The use of the name Alps in connection with the Transylvanian Mountains should bring to the mind of the reader the broad upland meadows from which the Alps of Switzerland get their name, rather than the rugged and inaccessible peaks which one is more apt to associate with Swiss scenery. In the Moldavian or northern part of the Transylvanian Alps the summits are comparatively low and more or less even-crested, suggesting an unwarped and dissected plateau surface, usually less than 5,000 feet above sea level. Even here dissection to a fairly strong relief gives a rugged topography difficult for an army to traverse. Along the northern boundary of Wallachia the mountains rise to heights of 8,000 feet and over, while local glaciation has left its traces in steep-walled cirques and peaks of more truly Alpine type. Broad upland remnants are nevertheless a predominant feature of the landscape. Evidently the Transylvanian Alps must be characterized as a difficult mountain barrier, but do not deserve the adjective "inaccessible." When one remembers that they are in large part covered by forests, their difficult nature from the standpoint of military geography is better appreciated.

**The passes**

Nine passes of military value afford opportunity for troops to cross through the Transylvanian Alps. For strategic reasons it is preferable to consider these in three separate groups. We may denominate "the northern passes" those lying north of the great bend in the range. (See map Figure 18.) Farthest north is the Bekas pass, crossed by a wagon road. At Gyimes pass, both railroad and wagon road unite the two sides of the mountains. A good wagon road crosses through the Oituz pass, while farther south another road or trail of inferior quality takes advantage of a less important gap. The "central passes" include two of first importance: Predeal, or Tömös pass, carrying the railroad and highroad from Bukharest to Kronstadt; and

Törzburg pass, crossed by a first-class wagon road. Of the three "western passes" the Red Tower pass is the most remarkable, consisting of the deep, narrow gorge of the Olt River, cut entirely through the mountain barrier and carrying the railroad and highroad from western Rumania northward to the important Transylvanian town of Hermannstadt. Farther west the narrow gorge of the Jiu River, often referred to as "Vulcan pass," * is traversed by a wagon road alone, while the pass of the Iron Gate, cut by the Danube River, is occupied by both road and railway.

**Terrain of the passes**

A fact of no small military importance is this: every one of the northern passes, and every one of the western passes, consists of the gorge or valley of a stream which rises on the Hungarian side of the international boundary and flows down-valley into Rumania. In other words, these passes are not cols or saddles at the crest of the range, but portions of narrow valleys where these chance to be crossed by the political boundary. All of the valleys facilitate the movement of hostile troops in the easier direction, downstream, into Rumanian territory.

**The formidable Danube barrier**

From the Iron Gate to a point southeast of Bukharest the Rumanian plain is protected by one of the most remarkable river barriers in the world. The Danube is in itself a great stream, half a mile or more in breadth and very deep. For much of its course it has a braided pattern, being split into two or more channels separated by intervening marshy flats. But of more importance is the broad belt of marsh and lake which borders the stream on either side, especially the northern side, and which varies in width from three to

* The Vulcan pass sheet of the Austro-Hungarian topographic survey shows Vulcan pass proper on a broad, flat-topped upland forming the summit of the range, crossed by a trail a few miles west of the Jiu gorge. It is the gorge, however, which carries the wagon road, which has in fact become the real pass since the road was constructed, and which is referred to when the name "Vulcan pass" is used in the following pages.

six miles, occasionally attaining a breadth of a dozen miles or more. The lakes are in part abandoned oxbow lakes and in part bodies of stagnant water filling lower portions of the backswamps or depressions between two sets of natural levees built by the river at different periods. Many lakes are covered in whole or in part by floating bogs, the broader marshes of the lower Danube, known as the Balta, being peculiarly treacherous and difficult to traverse.

**The Balta**

**Defensive value of the Danube**

Such a belt of marshy flood-plain, dotted with lakes and traversed by one or more channels of a great river, constitutes a formidable barrier even in times of peace; and between Belgrade and Cernavoda, a distance of 500 miles, not a single bridge spans the Danube. Even where important railways reach neighboring towns on opposite sides of the stream, travelers must make the transfer by ferry. For military purposes the situation is only slightly relieved by the fact that occasional tongues of dry land come to the water's edge, facilitating in some small degree a forced crossing. At the most favorable places, however, no troops could force a passage in the face of an enemy equipped with proper artillery and abundantly supplied with munitions.

**The open Dobrudja gateway**

From the Danube southeast of Bukharest to the Black Sea the Rumanian border consists of the southern boundary of Dobrudja. This is the only significant portion of the Rumanian frontier which is not formed by some natural topographic obstacle. It is absolutely unprotected. An open plain, somewhat more dissected near the Danube, is traversed by an artificial line of demarcation which is unrelated to any topographic feature. Here is an open gateway, a hundred miles wide, through which a Rumanian army might debouch with ease upon Bulgarian lands, or by means of which Rumania might itself be readily invaded. Only an opposing army of greater strength can close such an opening against enemy attacks.

*Paul Thompson.*

Cavern used as a secret Austrian gun position.

### *The Plans of Campaign*

Strategic possibilities of the Transylvanian salient

The geographic position of Rumania, considered in connection with the physiographic character of her frontiers, permits certain deductions as to possible plans of campaign. In the first place, it is evident that the moment Rumania entered the war a dangerous salient was necessarily imposed upon the new Teutonic front. The Hungarian province of Transylvania formed this salient, with its apex at the great bend in the Transylvanian Alps. To crush in the sides of such a salient is a favorite military manœuver, and in the present case this might be done by Rumanian armies advancing through the northern and western passes.

Wallachian salient and the Morava-Maritza trench

Southwest of western Wallachia the Morava-Maritza trench lay not far distant, and through this trench passes a railroad of the most vital importance to the Central Powers. Some critics suggested an advance across the Danube to cut this artery of Turkish life. It will be noted, however, that Wallachia forms a salient projecting into the Teutonic front, just as Transylvania projects into Rumanian territory. Already this salient was of dangerous proportions. To increase the danger by extending the apex forty miles farther into hostile lands would invite disaster.

Value of Dobrudja gateway for an invasion of Bulgaria

The open Dobrudja gateway lies much farther from the coveted Orient railway, but the distance is not prohibitive for a military campaign of the first magnitude. Secure in the possession of the Cernavoda bridge over the Danube, supplemented perhaps by other temporary pontoon bridges, a large Rumanian army might assemble in Dobrudja and then push southwestward through the gateway. Extending its front as it advanced, it could rest its left flank on the sea, where Russian control assured a safe supply line, and its right flank on the marshy plain of the Danube. Such a

manœuver possesses several noteworthy advantages: it starts with control of a safe passage of the Danube, which effectively turns that obstacle and enables the advancing Rumanians to flank the Teutonic allies out of their protected positions; it progressively straightens out the dangerous Wallachian salient; it provides a safer, if longer, advance to the Orient railway; and it looks forward to a possible junction with Sarrail's Saloniki army and the severance of Turkey from her European allies.

**Rumania's choice of campaigns**

Rumania did not possess sufficient troops to undertake two big campaigns at the same moment. She had to choose between the invasion of Transylvania through the mountain passes, and the invasion of Bulgaria through the Dobrudja gateway. Geographic conditions clearly demanded that she choose the later alternative. With a minimum of troops she could hold the Teutons at bay in the narrow passes, and throw her main strength into the Dobrudja campaign, which promised such gigantic returns as the destruction of the Orient railway, the possible capture of Constantinople, and the elimination of Bulgaria and Turkey from the war. On the other hand, an invasion of Transylvania would have only local results in the capture of certain territory and would indeed better the strategic position of the Teutonic allies by shortening their line. It could scarcely hope to eliminate any nation from the war, and could eliminate a large fighting force only in case the Teutons were unable to prevent the crushing of the salient before their armies had withdrawn from before the central passes. While such a campaign in Transylvania was in progress, there would be real peril that a Teuton army would enter Rumania through the open Dobrudja gateway; for Rumania could hardly concentrate sufficient troops for a vigorous offensive in the difficult mountains of Transylvania where every topographic advantage lies with the defensive, and at the same time spare the great

**Geographic considerations**

body of troops required to block an unprotected gateway 100 miles in width.

Political considerations

But now there enter political considerations, the *bête noire* of the strategist. Transylvania was a lost province which Rumania was pledged by the terms of her declaration of war to redeem. Enthusiasm for the war would be aroused more by an invasion of the coveted region, than by a campaign in Bulgaria, the remoter objects of which would for a long time be obscure to the masses of the people. If Rumania invaded Bulgaria, Russia might overrun Transylvania; and Rumanians did not want Russian troops in her lost province when terms of peace were discussed. Hence came the decision which placed political considerations above considerations of military geography, and which constituted the first factor in the tragedy of Rumania.

The Teutonic plan

For her part, Germany, the controlling genius of the Central Powers, permitted no political considerations to warp the plans for dealing with the Rumanian menace. She prescribed a plan of campaign which involved deliberate sacrifice of large areas in Transylvania to the impatient grasp of Rumania, and gathered strength for an assault on the Dobrudja gateway which should effectually close the way to any future menace to Bulgaria from that quarter. Let us now trace the history of the Rumanian campaign and note the rôle of physiographic features on the detailed movements of the armies.

# CHAPTER XVI

## CONQUEST OF RUMANIA

### *Rumania's Invasion of Transylvania*

**Invasion through the passes**

PROMPTLY upon Rumania's declaration of war her troops seized the passes through the Transylvanian Alps and began the invasion of the coveted province. Columns operating through Predeal and Törzburg passes converged on the important city of Kronstadt, while an independent column, debouching from Red Tower pass, captured Hermannstadt. Without opposing serious resistance to the invaders, the Teutonic armies fell back toward the northwest, shortening their battle front and at the same time permitting the Rumanians to extend their thin lines of communications from the passes into the mountainous country beyond. As the Teutons fell back toward the good lateral supply line formed by the railroad and highroad traversing the Maros valley, their powers of resistance increased simultaneously with the weakening of the Rumanian offensive, especially since the Rumanians were now compelled to transport munitions and supplies through a limited number of narrow mountain passes and far into the difficult country to the northwest.

**Difficulties of supply**

**Cutting Rumanian communications through the passes**

When the advantage in favor of the Teutons had reached the desired proportions, they fell upon the Rumanian columns with overwhelming power, broke their resistance with superior accumulations of artillery and shell, and drove them back into the passes. Where opportunity offered, the thin supply lines were assailed and retreats compelled by threats to, or actual severance of, these lines. The column operating

north of Hermannstadt depended upon the road and railroad through the Red Tower pass. A small Teutonic force, operating over rough trails through minor valleys in the mountains, succeeded in reaching the pass far in the rear of the Rumanian front and actually cut the railway upon which the existence of the column depended. Abandoning large stores of supplies to the enemy, the Rumanians made a precipitate retreat, cut their way through the small flanking force, and reëstablished themselves in a position on the Rumanian side of the border. In a short time all the Rumanian columns were back in the passes, fighting desperately to prevent a Teutonic invasion of their own country. The unfortunate Rumanian plan of campaign had collapsed.

**Rumanian retreat**

### *The Dobrudja Campaign*

Meanwhile the second step of the Teutonic plan was well under way. Von Mackensen, with superior forces, entered the open Dobrudja gateway. What was his object? This was a question which claimed much attention from military critics. Some were convinced that he was chosen to deliver the death blow to Rumania by pushing northward to the Cernavoda bridge, crossing by it to the main Rumanian plain, and taking Bukharest from the east. Geographic conditions were all against such an interpretation. At Cernavoda the marshy plain of the Danube is nine miles broad and the river splits into two main channels. In addition to two long bridges over the river channels, a third bridge spans one of the numerous lakes in the marsh, while the intervening spaces are traversed by high embankments or viaducts. The so-called Cernavoda bridge is thus nine miles long, consisting of three bridge sections and two viaduct sections. Von Mackensen could not expect to capture this bridge before its destruction; its destruction could be ren-

**Von Mackensen's objective**

**The Cernavoda bridge**

dered absolutely complete; and without it no safe and satisfactory line of communication over the marshy barrier was feasible. Furthermore, an attack on Bukharest from the east would necessitate a line of communication so excessively long and roundabout that the flow of shell to the battle front could scarcely be maintained at a rate sufficiently rapid to insure victory for Teuton arms. Geographic conditions imposed a supply line too long and too thin to permit a principal offensive by Von Mackensen's army.

**Necessity of closing the Dobrudja gateway**

On the other hand, geographic conditions demanded an important offensive in this region for the achievement of certain necessary ends. So long as the Dobrudja gateway remained open it was a serious threat to Bulgaria, the Orient railway, and the continuance of Turkish support. Rumania might recover from the folly of her invasion of Transylvania, and with Russian aid undertake a belated offensive in the right direction. Teutonic armies must, therefore, close the gate. This could be done by a large force, intrenched on or near the boundary, with its right flank protected by the sea and its left by the Danube marshes. But why intrench on a front one hundred miles long when an invasion of Dobrudja, pushed only seventy miles northward, would reduce the necessary front to less than a third that length?

**The form of Dobrudja as affecting the Teutonic objective**

Dobrudja is shaped like an hour-glass where the Danube River and the Black Sea coast bend toward each other. The narrowest part of the constriction lies north of the railroad which crosses the Cernavoda bridge and connects Bukharest with Rumania's only seaport, Constantza. An invasion of Dobrudja would, therefore, upset Rumanian plans for an invasion of Bulgaria, would add a certain amount of territory to the Teutonic holdings, would sever Rumanian intercourse with her Russian ally by way of the Black Sea, would result in the destruction of the only bridge which made possible an effective turning of the Teutonic positions south of

*E de Martonne.*

**Watergap of a tributary to the Olt River entering the lowland between the main range of the Transylvanian Alps and the minor parallel ridges to the south.**

**Part of the great Cernavoda Bridge over the Danube and its marshy flood plain.**

the Danube barrier, and would enormously reduce the number of Teutons required to stop the gateway through which alone a dangerous Rumanian offensive could move. If Von Mackensen could clear all Dobrudja of Rumanian and Russian forces and place the barrier of the lower Danube from Galatz to the sea between himself and his enemies, he could prevent a recrossing of the river by leaving small screens of troops at critical places, and might then withdraw his main army for use elsewhere. The fact that Von Mackensen, one of Germany's best generals, was placed in command of this invasion, proves that the German General Staff appreciated the high importance of the move. The fact that Rumania wasted her strength elsewhere and even left an inadequate defensive force at the gateway, suggests that some one high in her authority made a fatal blunder.

**Terrain of Dobrudja and Von Mackensen's campaign**

Von Mackensen began the invasion by moving his principal columns northeastward close to the Danube River, possibly because the calcareous formation of the Dobrudja plain leaves little water on the surface, and water in large quantities was needed for his troops. Turtukai and Silistria were taken and their defenders captured or driven to the north bank of the Danube. On a low ridge a dozen miles south of the railroad to Constantza the Rumanian armies, with Russian reinforcements, made a stand. They succeeded in holding Von Mackensen's main force in check while a violent assault on his weak right wing, nearer the sea, pushed that part of the Teuton line back to the southward a day's march. Late in October Von Mackensen heavily reinforced his right wing and made a second try on that end of the battle line. The manœuver was completely successful. Constantza was captured, and the danger of an outflanking operation compelled the Russo-Rumanian army to uncover the Cernavoda bridge. Part of the defending force apparently escaped across the bridge before it was destroyed, while the

remainder withdrew into northern Dobrudja, pursued by the Teutons. After a long campaign in the more hilly country of the north, where topographic conditions prevented a rapid offensive, the last of the Russo-Rumanian troops crossed to the farther bank of the Danube, leaving the enemy in undisputed possession of all Dobrudja. The Dobrudja gateway was effectively closed and securely locked.

**Natural barriers protecting Teutonic flanks**

It should be noted that throughout the Dobrudja campaign the Teutonic armies operated with their left flank exposed to the Rumanian armies west of the Danube, and their right flank exposed to the Russian fleet controlling the Black Sea. By " exposed " is meant that, if we disregard physiographic barriers, the Teuton line was completely outflanked at both ends and its position was impossible. Only when one contemplates the security offered by the protection of a broad, marshy valley and by that of the sea, can the rôle of geography in the Dobrudja campaign be fully appreciated. Throughout much of this campaign Rumanian troops were on the Teutons' flank, far in their rear and close to their vital line of communication. Yet Von Mackensen pushed his offensive secure in the confidence that the marshy Danube interposed an impassable barrier to any Rumanian attack. Only one such attack was seriously attempted. A Rumanian force effected a temporary crossing at one point where a tongue of dry land projected through the marsh to the river's edge. Unable to maintain itself with such precarious connections with the northern bank, it soon withdrew under pressure. On the Black Sea side the Russians were in control. But landing from boats in the face of a determined enemy is a hazardous operation, while supplying an invading army from the sea is almost equally difficult. Von Mackensen's flanks were in fact effectively covered by two great natural features.

### *The Battles for the Passes*

Von Falkenhayn attacks the mountain passes

While the campaign in Dobrudja was being pushed to a successful issue, Von Falkenhayn was assaulting the passes of the Transylvanian Alps in an attempt to break through to the Rumanian plain. Week after week his heavy artillery thundered its demands at the mountain gateways with but slight success. The Rumanian retreat was stayed where favorable physical conditions gave excellent opportunity for an effective defense. Massed in the narrow passes, Rumanian men and guns held the would-be invaders in check.

Attack on northern passes

It will be seen from the map of Rumania that Von Falkenhayn might make his main attack in any one of three directions. A successful advance through the northern passes would cut the main railroad in the Sereth valley connecting Russia with her new ally, isolate all of Rumania and the Rumanian army, and probably insure their eventual surrender. For such a campaign the Teutons enjoyed some advantages over the Rumanians. Both possessed good lateral supply lines in the shape of railways following close along the mountain base, but the Hungarian railway lies closer to the mountain passes than does the Rumanian line. Again, as already pointed out, the northern passes all lie east of the main divide, offering some advantage to Hungarian troops moving downhill into Rumanian territory. It appears that the Teutonic armies made violent attempts to break through one or more of these passes, but without success. Attacks at Oituz pass seem to have been especially severe, and fear of a possible advance at this point caused the Rumanians at Gyimes pass to withdraw some miles to avoid being cut off in case this occurred. But the retreat was only local and for strategic reasons. Whatever the other advantages favoring the Teutons, the advantage which always lies with the defensive in a difficult terrain could not be overcome.

Strategic railways

Oituz pass

Gyimes pass

**Attack on central passes**

Von Falkenhayn next concentrated large forces against the central passes. An advance over the Predeal and Törzburg cols would bring the invader direct to Bukharest and cut Rumania in half. The returns for a successful campaign by this route would not be nearly so great as in the former case, but would nevertheless be enormous. Again both sides possessed the all-important lateral railway line along the mountain base; and again the line on the Hungarian side lay closest to the passes. But again the power of the defensive in mountainous country could not be broken. Several weeks of violent assaults pushed the Rumanians back from the main col of the Törzburg pass to a secondary position, where they held firm. At Predeal the attacks seem to have been even less successful. By the middle of November Von Falkenhayn's armies had been vainly hurling themselves against the eastern and central passes for a period of six weeks. The Teuton commander was then perforce compelled to content himself with the third possibility.

**Törzburg and Predeal passes**

**Attack on western passes**

The western passes offered promise of a still smaller reward, but greater certainty of at least some success. Even if these passes were forced, only a small part of the Rumanian army could be cut off and destroyed. The main force would retire on Bukharest in good order. But in favor of an attack was the highly important fact that the lateral railway at the base of the mountains on the Rumanian side did not extend to the western part of the mountains, whereas the Hungarian lateral railway did so extend. Evidently the Teutons could use their railway to mass men and munitions at the Red Tower and Vulcan passes in overwhelming quantity, to meet which concentration the Rumanians would find themselves quite helpless. If any pass could be forced by the Teuton armies, it must be one of these two. Vulcan pass would perhaps offer the best opportunity, since the Hungarian railway sent a branch line within a few miles of it,

**Railway situation**

whereas the Rumanians had to depend on a single wagon road for a number of miles to the south. The existence of a trail across the mountains west of the Jiu gorge offered a further advantage, since by means of it a flanking force might cross the old pass on the summit and take the defenders of the gorge in the rear.

**Battle of Vulcan pass**

Vulcan pass was in fact chosen for the supreme attempt. The fighting here was very severe. After being pushed southward for several miles the Rumanians assumed the offensive and administered a severe check to the invader. Reports place the Teuton loss in this engagement as 1,500 killed and a larger number taken prisoner, while their defeated armies were driven back toward the north. But shortly after the middle of November the desired concentration of guns and shell was effected, and the Teutonic offensive renewed. Unable to match the enemy's superiority in artillery fire, the Rumanians gave ground, slowly at first, then more rapidly. When pressed out of the main pass, they made a stand on the first of the secondary ridges. Defeated here, they took up their position again on the next parallel ridge. But all in vain. The stop-gap to the pass was finally pushed aside, and the Teuton flood poured into the Rumanian plain.

**Western topographic barriers outflanked**

Immediately the entire western end of the Transylvanian Alps barrier and the western end of the Danube barrier were outflanked. With the Teutons on the open plain in their rear, there was nothing for the defenders of these natural fortifications to do except escape as best they could to the east before every avenue was closed by the advancing enemy. As it was, some 8,000 Rumanian troops were completely cut off in extreme western Wallachia, and later compelled to surrender.

**Munitions shortage**

About this time it became increasingly apparent that there was a serious and unexpected shortage of munitions in the Rumanian army. The sudden collapse of the defense at

Vulcan pass and the swift, if orderly, retreat of the Rumanians throughout the following weeks could not reasonably be explained on the basis of a munition shortage due to normal difficulties of supply resulting from poor supply lines alone. In a manner the retreat resembled the great Russian retreat of a year before; but whereas the Russians turned and gave battle behind every natural defensive barrier, the Rumanians scarcely halted for engagements of any real consequence.

**Rumania betrayed by Russian traitors**

The solution of this mystery is probably to be found in events disclosed by the Russian revolution. Russia was, for reasons of geographical position, the power upon which Rumania necessarily depended for aid. The Russian army was probably still loyal, but the Russian government was honeycombed with spies and traitors. Trainloads of shell consigned to the army were deflected to Vladivostok and other remote points by pro-German officials high in authority. Much needed supplies accumulated at remote depots in enormous quantities, under orders designed to render the Russian army and her ally helpless before the German assault. The great Russian retreat and the crushing of Rumania must be charged, not to the brilliant military genius of a Von Hindenburg, a Von Mackensen, or a Von Falkenhayn, but to the treacherous pro-German government which worked untiringly to reduce its heroic armies to a state of defenselessness. It is indeed a poor general who cannot defeat an enemy previously disarmed by some one else.

### *The Rumanian Retreat*

**Rumanians withdraw behind the Olt River barrier**

Had the Rumanians been properly supplied with shell the position of the Teuton army, debouching from a single, narrow pass and dependent on a single thin line of communication, would have been perilous in the extreme. As it was,

*Central News.*

**Red Tower pass in the Transylvanian Alps.**

*Central News.*

**Predeal pass, the main avenue of communication across the Transylvanian Alps from Bukharest to Kronstadt.**

the Rumanians were unable to profit by their opportunity, and fell back to the first effective line of defense, the Olt River, a fairly broad stream which issues from Transylvania through the Red Tower pass and flows south across the Wallachian plain to the Danube. Unfortunately, the railroad which parallels this defensive barrier lies west of the river, and would thus give a lateral supply line to the Teuton pursuers, while the Rumanians would have no equivalent advantage. This alone was enough to render the line of the Olt of doubtful value. Aside from this consideration, it was questionable how long the Rumanian forces could hold the line under heavy Teuton fire when they themselves were unable to reply in kind. The issue was promptly settled, however, when Von Mackensen, profiting by the Rumanian shortage of munitions, effected a passage of the Danube under cover of superior artillery fire at Zimnica, thirty miles east of the lower Olt. This manœuver completely outflanked the whole line of the Olt, and the Rumanian army fell back toward the east.

**Olt barrier outflanked**

The Wallachian plain is in large part an alluvial slope underlain by sands and gravels deposited by streams issuing from the Transylvanian Alps, and is traversed by the extensions of these rivers, roughly parallel to the Olt but swinging more toward the east in their lower courses. As the Rumanian armies withdrew from the line of the Olt they fought brief delaying actions along one and another of the parallel streams. Thus we hear of them deployed along the Niaslov River, and later find them fighting a vigorous action along parts of the Arges. This latter river was expected by many to form the defensive screen for the capital, Bukharest. It is, however, poorly adapted to such a purpose. A railroad parallels it on the side next the city, which is as it should be; but the stream is not large, it lies too close to the city in its lower course, and its direction, strongly south-

**Rôle of the parallel rivers**

**Arges River and the defense of Bukharest**

east, facilitated the outflanking of the defenders by an e force advancing eastward after capturing Pitesti and ing the stream near its headwaters. None of the pa rivers is supplied with broad belts of marsh, which renders streams of moderate size really formidable mil barriers.

**Rumanians retreat across the plain**

After abandoning Bukharest the Rumanian forces re northeastward, constantly swinging around more and to the north as required by the shape of the country bet the parallel bends of the Transylvanian Alps on the n west and the Danube on the southeast. To accomplish the Rumanian line, now strengthened by a large force of sians, must pivot on its right wing, marking time there the left wing, down near the Danube, could swing thr a great arc and reach its appointed position. This w difficult manœuver, made possible by the fact that the c try increases in ruggedness toward the pivoting point.

**Mountain terrain as pivoting point**

Rumanian right wing held the Teutons at bay in the m tains, while the left retired swiftly across the smooth pl

**Jalomitza River line**

During this part of the retreat we hear of a brief dela action along the course of the Jalomitza River, and c longer one at the Buzeu River. The Jalomitza is parall on its northern side by a railway which would afford the fenders a good lateral supply line, and the river with its m or less marshy flood-plain is a protective screen of some va It would appear that this line was outflanked, however, w the Teutons crossed the small headwaters near Ploesti, c tured that town, and pushed on toward the town of Buz One military critic based his discussions for some days on thesis that the main defensive line to which the Rumani were withdrawing was the line of the Buzeu River. G graphic conditions are distinctly against this thesis. T river is of fair size, but its course would permit a dangero outflanking move toward the east where the course of t

**Line of the Buzeu River**

stream bends far to the north. The barrier is not sufficiently formidable to justify an attempt to hold its southwestern sector after other troops had reached its northeastern portion, thirty to forty miles in the rear of the first position. A former course of the river, leading more directly eastward to the Danube and now occupied by marshes and lakes, might make a better line so far as direction is concerned; but it is not a barrier of serious proportions. Another reason why the Rumanians could not stand on the Buzeu line is found in the position of the railway, which parallels the stream on the southern side, thus affording a lateral line of communication for the enemy. With such an advantage the Teutons could quickly distribute men and artillery to any chosen point on the line and pierce it; while the defenders, lacking lateral communications, could offer but feeble resistance. The same objection applies to the so-called Sereth-Trotus line, selected by the same critic as the main defensive position after the Buzeu line had been passed. Both on the middle Sereth and the Trotus the railway is on the wrong side of the river. It would seem as though the railroads had been placed with reference to a foe expected from the northeast rather than from the west.

**Sereth-Trotus line**

### *The Battle of the Sereth-Putna*

After a sharp contest on the Ramnic River the Russo-Rumanian forces took their final stand behind the line of the lower Sereth and Putna Rivers. Inasmuch as some critics were convinced that no attempt would be made to hold the Putna line, and since the Teutonic pursuit was in fact brought to a complete check along this line in spite of desperate fighting, it will be worth while to examine the physiographic characteristics of the Putna and Sereth valleys with some care.

**Retreat to the Sereth-Putna line**

**Headwaters of the Putna**

The Putna River rises near the great bend of the Tran vanian Alps and flows in general southeastward across plain to join the Sereth between the towns of Focsani a Galatz. Before leaving the mountains two main headwa branches of the stream flow toward each other along the p nounced lowland already described as extending parallel the main crest, and unite to form a single river which h cut a transverse gorge through the first and most promine of the secondary parallel ridges. In this region the Rum nians utilized the secondary ridge, which rises 1,500 fe above the adjacent valley, as their natural defense.

**Marshy valley of the lower Putna**

After leaving the foothills, the Putna, still a stream o but moderate size, has a marshy flood-plain from one-thir of a mile to more than a mile in breadth. In the vicinity o Focsani the marshes widen out to a breadth of several miles but just below there begins a stretch of dry land which continues to Fundeni, and which would facilitate a crossing by hostile troops. Fortunately, it is just here that the Sereth flows parallel and close to the Putna for some distance, reinforcing the latter by a really formidable obstacle.

**Vulnerable nature of terrain at Fundeni**

At Fundeni, however, there is neither marsh nor a double river barrier. Of all points on the Sereth-Putna line Fundeni appears to offer the best opportunity for an enemy crossing. The town lies on the north bank of the Sereth within a meander loop which projects southward. This would expose the town to a converging fire from three sides, and thus still further facilitate a crossing by hostile forces. It is true that there are some points favorable to the defense. The river at this point is nearly a quarter of a mile broad and too deep to ford. A number of old oxbow lakes on its southern side afford some additional protection. The great marshes of the lower Sereth begin close to the downstream side of the meander, rendering it difficult for an enemy to develop the full force of a converging attack. But since the

**Marshes of the Sereth and Danube**

marshes just referred to continue in a broad belt to the Danube at Galatz, and the Danube from Galatz to the Black Sea is an impassable barrier of distributary river channels on a marshy delta dotted with lakes both large and small, it must still appear that the Fundeni sector is from its physiographic character the point where enemy attacks should most confidently be expected.

**Railway communications back of Sereth-Putna line**

We have seen that the Sereth-Putna line is a defensive barrier of some degree of formidableness. An examination of the railways in this region shows that the line is supplied with lateral communications well adapted to deliver shells, supplies, and reinforcements to the defenders, wherever need should arise. The Sereth is paralleled by a railway from Galatz to the mouth of the Putna. The main central railway of Moldavia, over which Russian reinforcements must largely come, leads up to the center of the Putna defensive line, while a lateral branch connects this main railway with the one paralleling the lower Sereth. The extension of the Putna line along the secondary ridge and thence northwest past Oituz pass and Gyimes pass is paralleled by the Trotus valley railway. All these railways, it will be noted, are on the north of the defensive barrier, and so protected by it from hostile attack. This alone would be sufficient to explain why the Sereth-Putna line is superior to the Sereth-Trotus farther north, or the Buzeu line farther south.

**Attacks on the Sereth-Putna barrier**

The Teutonic armies arrived before the Sereth-Putna line during the first week of January, 1917. They first tried to force the marshes of the Putna River north of Focsani, at the end of the railway and highroad along which one of their main columns was advancing. At one time, under cover of a fog, some Teuton troops gained the northern bank of the river but were quickly driven back. A second attempt was made near Galatz, in the hope of turning the left flank of the defensive line. After capturing Braila, a Teuton column

**Attempt to turn east end of barrier**

struggled painfully along the railway embankment which crosses the marshes to Vadeni and the bridge over the lower Sereth. Many days of heavy fighting resulted in the capture of Vadeni, but it proved impossible to manœuver to advantage in this region of marshes. The crossing of the river could not be effected, and Vadeni was soon recaptured by a Russian advance guard.

**Attack on the Fundeni sector**

By this time troops and supplies had been assembled for a violent assault on that part of the line offering the best chance of a successful crossing. Advancing over the dry ground toward Fundeni, the Teutons launched an offensive at the town shortly after the middle of January. The importance of this attack may be gauged from the fact that the best Prussian troops in the Teuton armies were thrown into the fighting. Day after day the struggle dragged on, and still the river barrier barred the way to Teuton ambition. February found the baffled armies of the Central Powers still fighting to cross the barrier, and the world began to realize that the marshy valley of the Sereth and Putna constituted a military obstacle of commanding importance.

**Teutons fail to force the barrier**

**Attempt to turn west end of barrier**

While suffering defeat in every attempt to turn the left wing or to break through the center of the Sereth-Putna line, the Teutons were not idle up in the mountains, where a successful advance would turn the right of the line and flank the defenders out of the entire position. For more than a month a colossal effort was made to break through the Oituz pass. To understand what success in this endeavor would mean, one must carefully note the pattern of the valleys in the vicinity of the pass. In the upper Trotus valley four branch ravines, converging upon the town of Onesti, have more or less practicable passes near their heads. Thus the upper Trotus itself heads in Gyimes pass and carries a railroad and highroad; the upper Uz heads in an unimportant pass through which there runs a trail; the upper Oituz

**Terrain of Oituz pass**

forms the Oituz pass, which has a good wagon road; and the upper Casinul starts at a minor pass provided with a trail.

Strategic situation at Oituz pass

Now it is clear that if the Teutons succeeded in forcing any one of these passes and reached Onesti, the trunk supply line would be cut and the forces defending the other passes would be trapped. But this is not all; for once the four passes were thrown open by such a successful manœuver, and a Teuton army concentrated in the Trotus valley, backed by three good supply lines (a railroad and two wagon roads) through the Gyimes and Oituz passes, nothing could check a Teuton advance down valley to its junction with the Sereth. This would take in the rear all the northwestern extension of the Putna line and would cut the central Moldavian railway, the vital artery upon which all the rest of the Putna line depends. The moment this main railway was reached, a retreat to the northeast, behind the middle Sereth River, would be forced. In other words, a success in one of the passes at the right of the Sereth-Putna line would outflank practically the entire position.

Teutons defeated by mountainous terrain

No wonder the fighting at Oituz pass occupied the attention of the world for a number of weeks! Four Teuton columns entered the heads of the four branch valleys and all fought desperately to reach Onesti. The advance through Oituz pass seemed to promise the best advantage to the Teuton offensive, and would reach the Trotus valley railway only a few miles from the crest of the range. But the power of the defensive, blocking the narrow valleys, was too great. The column in the Casinul valley got within ten miles of its objective when it was thrown back. The other columns were even less successful. A furious attack on the secondary ridge farther southeast fared no better. Every attempt to reach the Trotus valley railway failed. The difficult mountain topography prevented the turning of the Sereth-Putna

line on the right just as effectively as the marshes near Galatz prevented the turning of the left.

The Rumanian campaign, beginning on the defensive line of the Transylvanian Alps and Danube marshes, ended on the defensive line of the northern Transylvanian Alps and Sereth-Putna marshes. Many months were to pass by with the two opposing armies deadlocked along this same natural topographic barrier, and when the United States entered the world conflict it found this deadlock unbroken.

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